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ON  
THE INFLUENCE  
OF  
MINUTE DOSES OF MERCURY,  
COMBINED WITH  
THE APPROPRIATE TREATMENT  
OF  
VARIOUS DISEASES,  
IN RESTORING THE FUNCTIONS OF HEALTH,  
AND  
THE PRINCIPLES ON WHICH IT DEPENDS.

BY  
A. P. W. PHILIP, M.D., F.R.S., L. & E.,  
FELLOW OF THE ROYAL COLLEGES OF PHYSICIANS OF LONDON AND EDINBURGH, &c.

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## ADVERTISEMENT

TO THE FIRST EDITION.

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THE Editors of the London Medical Gazette, a few years ago, did me the honour to appropriate a number of their Journal to my observations on the subject of this publication. The manner in which these observations have been received by the members of our profession has induced me greatly to enlarge the more immediately pathological parts, particularly those relating to the steps by which organic disease is established, and republish them in the present form.

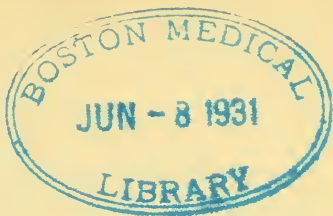


P R E F A C E  
T O T H E S E C O N D E D I T I O N .

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THE circumstance of a Second Edition of the following Treatise having been called for within a twelvemonth, tends to strengthen the hope which suggested its publication, that the practice recommended in it will be found useful, and particularly in certain cases of frequent and severe suffering, and sometimes fatal tendency, in which the usual means have proved unavailing.

I have been accused of constantly in this and other Treatises referring to my former publications. Those who make this statement in the way of censure have not sufficiently considered the subject to perceive that all are but parts of one whole, and that without these references what I adduce, being deprived of the foundation on which it rests, must have appeared little better than a mass of uncertainty and confusion.



ON THE EFFECTS  
OF  
MINUTE DOSES OF MERCURY.

§c. §c.

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INTRODUCTION.

It is now about thirty years since I first began to employ minute and frequently-repeated doses of mercury. I was led to them by observing that, in lessening the dose and increasing its frequency, in proportion as we lessen the immediate, we increase the alterative, effects of this medicine. It had long been my wish to lay before the profession the whole of the circumstances which influence its effects when employed on this principle; but these are so numerous, and some of them, from the nature of disease, so complicated, that I found it difficult to arrange the subject in a way that would give to others a clear and full view of it, and was thus till lately deterred from the attempt.

Having, in the early part of this practice, met with a few fortunate cases, I imagined that it was difficult to assign limits to its beneficial effects in a certain

description of diseases. By degrees, however, these limits became apparent, but they have left a field more than sufficient to compensate for the pains I have bestowed on the subject. I have found that with an attention to the circumstances which I am about to state, the minute doses never do harm; and this I believe, under any circumstances, cannot be said of any other mode of exhibiting mercury; and that in a wide range of cases, both original and sympathetic, they effect what cannot be effected by any other means with which we are acquainted. It is particularly grateful to my feelings that I have now obtained the testimony of many of my professional brethren, to confirm my belief that they have been the means of restoring many who could not otherwise have been restored.

Large doses of mercury cannot be repeated at short intervals without often rendering the remedy as pernicious as the disease, and sometimes more so; and when they are given at distant intervals, the effect of one dose is frequently lost before another is taken; so that it often happens that little or no progress is made in the cure; and there is nothing but temporary relief to compensate for the debilitating effects of each dose; while, with respect to the minute doses, although each does little, this little it does without any strain to the constitution, and the next dose comes before the effect is lost; so that a gradual accumulation of the beneficial effect is obtained, and that, if the circumstances I am about to point out be attended to, without any injurious effects to deduct from it. The parts affected are thus gradually solicited to resume their healthy functions, and though slowly, at length effectually restored.



I have endeavoured in the following pages to avoid all prepossessions, and confine my attention to the results of actual practice, so that, whatever be their errors, they contain as accurate an account as I can give of the facts collected in the practice of a long series of years, with the mind prepared during a still longer period by a more than usually laborious study of the animal economy.

There is no other medicine which has been, and still with many is, the subject of such strong prepossessions as mercury. Some, confining their attention too much to the beneficial effects resulting from it, and which it was found could not otherwise be obtained, were led to an incautious use of it ; and thus it naturally happened that others, struck with the mischief it occasionally did in the hands of its admirers, had their attention as exclusively directed to its injurious effects ; for, from the nature of things, all medicines capable of much good are also necessarily capable of much evil. Which of our most valuable medicines is not poisonous in larger doses ?

The public, which, possessed as it is of a thousand eyes and ears, seldom remains long in error, has decided between these opponents ; and no other medicine, in those countries where the practice of medicine is best understood, is now in such general employment, and I believe in all the countries of Europe its employment is gradually becoming more so. This is in a remarkable degree the case in France. It therefore only remains for us to inquire how we can most effectually secure the advantages and avoid the injurious effects of so active a remedy.

One of the chief means, we shall find, is lessening

the quantity employed, which, as far as I am capable of judging, has in this country been at least ten times that from which its most beneficial employment results. The others are numerous. All who are accustomed to reflect on the endless variety of disease, the various circumstances in which we are placed, the difference of constitution in different individuals, and the power of habit in all, will perceive that the most beneficial employment of such a medicine must be a question of a very complicated nature, and one relating not to it alone, but to all others, which, given in combination with it, tend either to improve its beneficial, or [correct its injurious, tendencies.

It is remarkable that, notwithstanding the general and long-continued employment of mercury, it should not have been known that all its constitutional effects, not excepting complete salivation, may generally be obtained by such doses as half or even the third part of a grain of blue pill taken three times a day : that is, doses equal to the twentieth and thirtieth part of a grain of calomel ; for a grain of calomel is equal, whether we regard its purgative, or, when divided into minute parts, its alterative, effects, to about ten grains of blue-pill. If such be the case, what should induce us to employ larger quantities, except the disease requires a more rapid effect than can be obtained from such doses, or, from some peculiarity in it or the habit of the patient, the sensibility to their effects is impaired? No other person, as far as I know, has been led to the use of these doses of mercury, which I think it will be admitted from the facts I am about to state, constitute, in a great variety of cases, its most beneficial employment.

Many have expressed their surprise, that any caution respecting salivation is requisite, in employing such doses as half a grain of blue-pill, yet I shall have occasion to refer to a case in which they produced severe salivation, where the largest doses had failed to produce any degree of this effect, the cause of which I shall have an opportunity of explaining in treating of the *modus operandi* of mercury. The rule I follow is, to direct the patient, when the least tenderness of the gums in brushing them, or in eating any hard substance, is felt, to discontinue the pills for one or two days, which is generally sufficient to remove it, or for whatever time is necessary for this purpose ; and, although a slight degree of tenderness is often felt, I never have any trouble from this cause ; for no instance has occurred during a period of thirty years in the use of such doses, of the sudden salivation which sometimes supervenes when mercury is taken in the usual way ; in which case, when any cause suddenly checks its free passage out of the system by the skin, or other excretory, a large quantity is suddenly thrown on the mouth. For a similar reason the patient is much less liable to the effects of cold, than under the usual modes of giving mercury, the minute doses having comparatively little effect in opening the skin. Confinement is never necessary on account of the medicine ; and the only precautions I have found at all requisite in this respect are not to get wet, nor to be much out at night, which are generally necessary on account of the disease, independently of the medicine.

The observation just made, respecting the gums, applies also to the bowels. The patient never experiences the sudden and severe affections of them which

are apt to arise under the use of larger doses. The quantity of the medicine is too small in either case to produce any considerable effect, unless its use be continued after the irritation has supervened, and similar observations, we shall find, apply to its debilitating and other injurious effects. The foregoing circumstances, and particularly the tendency to salivation, always giving sufficient warning afford a degree of security under the use of the minute doses which is not to be obtained when larger doses are employed. In short, this mode of employing mercury, while it is in a large proportion of cases the most efficacious, in a great degree changes its nature as a medicine, wholly relieving us from the dread of those sudden and violent effects, which sometimes occur from larger doses, and have excited so strong a prejudice against it.

The idea of future injury arising from the use of mercury where no present inconvenience results from it is now, I believe, universally acknowledged by medical men to be wholly imaginary.

To chronic disease the minute doses are peculiarly adapted. A disease which has become habitual, can only be counteracted by a remedy which, without injury, may be rendered habitual also; and in acute diseases, although they are not sufficiently active to effect the cure, we shall find them in many cases, essentially aiding the more active, and consequently injurious means, and enabling us to lessen both their extent and continuance.

The most advantageous employment of mercury, however, is not the only object of the present publication: it has another, so intimately connected with a medicine of such general use, that it will soon appear to the reader.

that it is impossible to separate them: namely, to point out the extensive influence of the laws of sympathy in regulating the phenomena of disease, and consequently the operation of the means which relieve them\*. It would not be difficult to shew, that on the power of sympathy the phenomena of general diseases wholly depend; and all internal local diseases may be so simulated by their corresponding sympathetic affections, that there is often great difficulty in distinguishing them—a difficulty not a little increased by the constant tendency of the sympathetic to change into the real disease, which frequently, in regulating the treatment of the different stages, renders morbid dissection itself, in general our surest guide, fallacious.

The effects of sympathy, which, under all circumstances is constantly operating in our frame, have never been disregarded by physicians; and the powers of mercury have in many respects been well understood by them. It is not difficult to prove, however, that the former have not sufficiently commanded their attention, nor have they sufficiently investigated the latter.

Even in the present state of medicine in this country, one of the most frequent and fatal errors is the treatment of the sympathetic, which, in a great proportion of cases, becomes the most prominent, disease, without the necessary attention to the original affection, obscured, but not removed by it; for it is in vain to attempt to

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\* In papers published in the Philosophical Transactions for 1833 and 1834, on the Nature of Sleep and Death, with several preceding papers published in the same Transactions for 1829—31—33, and 34, all of which have since been republished in a Treatise on the Nature of Sleep and Death, I have endeavoured to give a view of the various sympathies of our frame, which so essentially modify the nature and phenomena of disease.



obviate a consequence, if the cause be still allowed to operate, a far less degree of which will support than that which originally caused the train of symptoms to which the attention of the practitioner is too often in such cases unfortunately confined.

I would particularly beg to direct the reader's attention to what is said in the following treatise of pulmonary consumption, of which there is more than one species altogether sympathetic, all cases of which, notwithstanding, it is customary to treat in the same way; by which every chance of recovery, even in those cases in which we shall find recovery under proper treatment at the proper period almost certain, is often lost; and similar observations, it will appear, apply to many other diseases.

The principles on which mercury operates have, as far as I am capable of judging, been in several respects misunderstood, and consequently the means by which we may as much as possible obtain the good and obviate the bad effects of this medicine, in several ways mistaken. The attainment of these objects the reader will perceive, if I am so fortunate as to carry him along with me, in a great measure depends on a correct knowledge of the laws of sympathy. Without this knowledge, however well the operation of mercury may be understood, its correct application is impossible.

I need hardly say to those acquainted with our profession, that, in attempting to introduce the plan of treatment I am about to lay before the reader, I have had much opposition to contend with. This I have always regarded as a necessary effect of the nature of that profession, and have borne it patiently. When new plans are every day suggested, of which not one

in a thousand proves to be of any value, we are naturally inclined to turn a deaf ear to the sanguine expressions of our brethren, when they think, they have hit upon any improvement of the usual means. But I owe it to them to say, that, with very few exceptions, I have found them as ready to admit the truth as I had any reason to expect, and in many instances anxious to ascertain it. Some, from the cause just stated, have joked in a good-natured way ; and I could point out one or two who have sneered ill-naturedly enough—for there are necessarily men of narrow mind, as well as feeling, in every community ; but when I say, that, in attempting to modify the employment of the most important of our medicines, that which is at once both the most efficacious and in most general use, I have every reason to be satisfied with the reception I have met with my professional brethren, I pay them a just, and, considering the nature of our profession, no trifling compliment ; and, let our neighbours say as they will of our jealousies, I have never known any instance in which a sincere and rational attempt to improve the treatment of disease, has not met with a similar reception.

IN the following observations I shall, in the first place, consider the *modus operandi* of mercury in general, which is necessary to a clear understanding of the principle on which the minute doses operate ; then the *modus operandi* of the minute and frequently repeated doses, compared with that of the usual doses of this medicine ; and lastly, I shall point out the cases to which the minute doses are adapted.

## CHAPTER I.

## OF THE MODUS OPERANDI OF MERCURY.

It appears, from every thing we know of the effects of mercury, and the laws of the living animal body, that it acts in two ways. It has a local and general operation, and its general operation is of two kinds. Like all other substances capable of affecting the living animal, it at the same time operates on the part to which it is applied, and on the system in general through the nerves of that part. But, as it is one of those medicines which are capable of being absorbed, it also influences the whole habit, by circulating with the blood, and thus directly acting on the various organs, by its immediate application to them; and although, as we might have foreseen from the laws of the animal economy, it is capable, by its action on the part to which it is applied, of affecting every other part, the nervous system forming the living animal body into a whole, which cannot be impressed in any one part without all others, more or less, feeling the impression, it is in consequence of its absorption, that it most effectually influences distant parts. Its operation is, more or less, that of a stimulant; for, according as circumstances direct it to particular organs, we find it exciting them to an increased performance of their functions. While it retains the active form in which it is introduced, it seems incapable of remaining in the system. If it be prevented from running off by one



excretory, it finds its way by another ; thus we see it exciting the skin, kidneys, salivary glands, &c. Like all other metals, in its metallic and insoluble form, it is inert. In the state of quicksilver it may be freely drank without any inconvenience but that which is occasioned by its weight ; and it can only remain in the system when deposited in the cellular substance in that form, to which it is reduced by the chemical powers of the constitution ; for, in whatever state it is given, these powers always reduce it to its original metallic form. It is well known that gold and silver are amalgamated with mercury, if worn by a person whose system is impregnated with it.

When taken internally, it is doubly applied to the stomach and bowels, immediately, and through the medium of the circulation, for we often have to contend with its irritating effects on the alimentary canal, when it is only introduced by the skin. In this canal and the salivary glands alone, its passage excites sensible irritation, which, if considerable, causes inflammation ; in the former only superficial, and generally in a slight degree, but in the latter often such as to affect all the neighbouring parts.

In both cases, as it generally increases the natural secretion of the parts affected, the increased discharge, like all other discharges, tends to relieve the inflammatory action ; it is where the discharge is least—that is, where there is some impediment to the free operation of the mercury in increasing the secretion from the part—that the inflammatory tendency is greatest.

Such are the more prominent effects of mercury introduced into the system ; but I have, in my *Inquiry into the Laws of the Vital Functions*, been at much

pains to point out that there is no agent capable of affecting the living animal body that does not possess both a stimulant and sedative power with respect to it, according to the degree in which it is applied, and the state of the body at the time of its application ; the stimulant arising from the less, the sedative from the greater application of it ; and that the degree in which agents possess the stimulant and sedative power, although in the same agent always in the same proportion to each other, is, in different agents, in no determinate, but every possible, proportion. Thus, spirit of wine possesses a great degree of stimulant, compared with its sedative tendency, which only appears when it is taken in excess ; while tobacco possesses a great degree of the sedative, and little stimulant tendency, which appears only when it is applied in a very minute quantity.

The sedative effect of some agents, as of opium, is chiefly exerted on the sensibility ; of others, as tobacco, on the moving powers of the animal system. While the influence of the former, therefore, may often be salutary, that of the latter, except under very peculiar circumstances, is always pernicious.

There may be some objection to using the term sedative for agents of both descriptions. In this sense, however, it is used by writers, although not constantly, but I think it is better thus to employ it than to introduce a new term, as after this explanation no ambiguity can arise from it. Besides, as both act by diminishing the vital powers, it is convenient that there should be a term common to both ; and what I am about to say will be sufficiently distinct, without a term to designate either alone. By sedative, then, I mean whatever depresses the powers of the system, whether

sensitive or motive, and whether it affect both or either, although the more common use of the term confines it to the agents which impair the sensibility.

No agent can impair the sensitive without more or less impairing the motive powers, because the latter in many instances depend on the former; but it is very possible to impair the motive without causing any diminution of the sensitive powers, and even with the effect of a morbid increase in them, because the derangements which accompany the weakened actions of life often prove to the sensitive powers a fruitful source of irritation. Thus, that class of sedatives whose operation is on the motive powers alone, are often doubly pernicious,

Mercury, like other agents, possesses the sedative as well as the stimulant property; and its sedative property is wholly exerted on the motive powers—for when it appears to lessen the sensibility, this effect seems to arise merely from its removing some cause of irritation. Its sedative tendency is very different in different constitutions; and in some rare instances it exists to a degree that wholly precludes its employment. The sedative effects of mercury, then, as of all other medicines possessing similar properties are known by its producing a state of debility, with or without more or less nervous irritation according to the circumstances of the particular case.

Thus the injurious effects of mercury may be divided into two classes—those which arise from an excess of its stimulant, and those which depend on its sedative effect. By the former it may cause all the evils of extreme irritation; by the latter it tends more directly to impair the powers of life; and these effects admit of every degree, from that of a very mild to that of the

most destructive agent, according to the quantity employed, the form in which it is given, the nature of the disease, and the state of the particular constitution.

Let us now consider what are the virtues of this medicine, which, notwithstanding its injurious tendencies, still render its use in this country more general than that of any other ; for it would be absurd to suppose that it had obtained this general employment, without possessing some extraordinary beneficial powers to compensate for its evil tendencies.

It will readily be supposed that a medicine, possessed of so great a power of exciting the various secreting surfaces, must prove a means of relief in many states of disease, especially those attended with a general failure of power in these surfaces. To this effect, for example we are in a great degree to ascribe its beneficial operation in fever, particularly when it excites the bowels, or is determined to the skin, the most extensive of all the secreting surfaces ; and in the various forms of dropsy, and other cases connected with failure of power in the extreme vessels.

In most instances, however, the failure in secreting surfaces is but the secondary part of the disease, depending on some more partial and specific derangement. If, therefore, the beneficial effects of mercury were confined to its influence on the secreting surfaces, the relief afforded by it would be imperfect and temporary ; and this is often the case, when the original derangement is of a nature which it cannot influence.

But we find in many such cases, that it is capable of permanent relief ; it must, therefore, possess some beneficial tendency besides that of a mere stimulant to those surfaces. It is necessary, therefore, in

order to understand the nature of the extensive influence of mercury in the cure of disease, to look for some other principle of action ; and in the peculiar effects of this medicine, compared with the well-established laws of our frame, we shall find such a principle.

Although all substances capable of affecting the living animal act as stimulant or sedative, according to the degree in which they are applied, yet there is in the effect of each something peculiar to itself. Thus we have just seen that the proportion in which they possess the stimulant and sedative powers, is different in different agents, and that the latter in some agents is chiefly exerted on the sensitive—in others, on the motive powers. These differences are easily observed and readily classified. But there is an infinitive variety both in the stimulant and sedative effects of different agents, which, from their number and indistinctness, cannot be reduced to any general principle of classification ; and physicians have attempted nothing farther than to divide medicines into those best suited to influence the state of different organs. Thus we speak of aperients, expectorants, diaphoretics, diuretics, &c., and we have no means of knowing the peculiar properties of each particular agent, but by observing the effects it produces.

The most remarkable of the effects peculiar to mercury, is its influence on the liver. It is not surprising that a medicine which so powerfully influences the secreting organs in general, should influence the secreting power of this organ ; but, independently of this effect, it has a specific operation on the liver, a power not merely of exciting its function, but of correcting the various derangements of that function in a way which it does not possess with respect to any other organ, and

which no other medicine possesses with respect to the liver ; and that even to such a degree as not only to restore a healthy state of the bile in various deviations of this fluid, but often even to correct the most formidable change of structure in the organ which secretes it.

In my Treatise on Indigestion, I have had occasion to point out at length the intimate sympathy which exists between the stomach, liver, and that intestine, which immediately receives the food from the stomach, and where it is mixed with the bile and pancreatic juice, the three chief digestive organs, which so constantly partake of the affections of each other, that all are injured or relieved by causes affecting any one. Thus mercury, possessing no particular power of relieving the affections of the stomach or duodenum, and even ungrateful to both, often becomes indirectly the best means of relieving their derangements, so often caused or supported by a disordered action of the liver.

When, therefore, we consider that the sympathies of the digestive organs are more extensive than any other, so that there is hardly any disease of which they do not partake, and whose course is not influenced by them, we are at no loss to find one cause of the extensive effects of the medicine which so essentially controls them.

But a principal cause of this extensive sympathy of the digestive organs, is the peculiar sympathy of the liver itself with the chief source of nervous power, the brain ; in consequence of which, all the affections of the one are immediately felt by the other. However severe inflammation of the stomach and bowels, the intellects remain unaffected. I have seen it prove fatal within twenty-four hours, the mind remaining entire to the last ; while acute inflammation of the liver is generally



attended with delirium. Melancholy even takes its name from a morbid state of the bile.

When it was supposed that the office of the brain is chiefly confined to the mental functions, and that its principal relation to other parts is that of bestowing on them sensibility and voluntary power—when it was supposed incapable of directly influencing either the heart or blood-vessels, on which the vital powers so evidently depend, we had a very inadequate idea of the importance of this organ in the animal economy; but when we know that it is not only capable of directly influencing the action of the heart and blood-vessels, and that to their minutest ramifications in every part of the system\*, and that the secreting and other assimilating processes are not merely influenced by, but wholly dependent on it and the spinal marrow†, we can easily understand how its affections controul all the functions of life; and can feel no surprise that whatever essentially influences it, should also extensively influence the phenomena of disease.

These are fruitful sources of the influence of the liver in diseased states of the system; but even these are not its only sources. All other parts receive their blood directly from the heart; it receives the principal part of its blood from the other abdominal viscera. It is thus also, as well as by its sympathy with the brain, intimately connected with the whole tract of the alimentary canal, the internal surface of the body, and through it, in consequence of the sympathy

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\* My Inquiry into the Laws of the Vital Functions, and papers in the Philosophical Transactions for 1815.

† *Ib.*; and my papers in the Philosophical Transactions for 1817, 1822, 1827, 1829, and 1833.

which exists between it and the external surface, with this surface also. No affection of either can take place, without more or less affecting it through both the nervous and sanguiferous systems; and by the state of these surfaces, more than any other cause, the general phenomena both of health and disease are influenced. The great extent of the liver is also to be ranked among the causes which contribute to its influence in the animal economy, in consequence of which, whatever influences the distribution of the blood in it, more or less influences its distribution in every other part. Such are the conclusions, respecting the influence of the liver, to which we should, *à priori*, be led by a knowledge of the structure and functions of our frame, and they are amply confirmed by direct observation.

All who have had extensive opportunities of observing the phenomena of disease, must be struck with the manner in which the state of the liver influences, and is influenced by them, to whatever class they belong. It is unusual in any formidable disease, whether general or local, not to find the function of the liver more or less disturbed; and wherever it is influenced, the proper treatment of the disease more or less depends on the state of this organ. It is by no means uncommon to find diseases, particularly of the vital organs, intractable till the accompanying derangement of the liver has been observed and corrected; and I have often in such cases seen, not only the patient, but the medical attendant, surprised at the immediate relief thus obtained.

When, for example, inflammatory affections of the chest have been but imperfectly relieved by the usual means, and have constantly continued to recur; or the patient has laboured under an obstinate though languid



fever, with confusion of mind, and sometimes a low muttering delirium, a fulness and tenderness in the region of the liver have been discovered ; on relieving which, by the usual means, the whole of the symptoms have immediately and permanently yielded.

Thus it is that in warm climates, where the sympathies of our frame are most active, not only in all febrile, but even in all chronic deviations of health, affections of the liver become the leading feature, and when protracted they all equally terminate in permanent disease of this organ.

I have for many years past, in every case, whether acute or chronic, been in the habit of examining the region of the stomach and liver as regularly as that of the pulse ; and I think all who will take the trouble to do so, will confess that the one examination is often of as much importance as the other, and that in many cases the former is the more important of the two. The state of the pulse is hardly more uniformly affected in disease than that of the liver.

It is the sympathy of the liver with the general source of nervous power, and the other circumstances relating to this organ which have been enumerated, that, even more than the sympathies of the digestive organs in general, gives to the medicine that so powerfully controuls it, its extensive influence in the cure of diseases.

Such I conceive to be the causes which have rendered the employment of mercury so general in the practice of this country ; which, resting on more extended as well as more accurate principles, it is not assuming too much to say, is more effective than that of perhaps any other ; a position which is supported by a fact I have already

had occasion to refer to, that the practice of other countries is gradually becoming more and more assimilated to that of our own.

If the state of the liver be so extensively connected with that of all other parts of the system, and, in particular, so powerfully influence the other digestive organs, with all their extensive sympathies; is it surprising that a medicine which has so great a power in controlling the affections of this organ, should hold a chief place amongst the means of cure; and that in the country where the practice of medicine is best understood, it should be found in most general employment?

It will be admitted, from all that has been laid before the reader, that, to say nothing of its effects in the disease for which it was first introduced, the treatment of which chiefly belongs to the surgeon, it is well worth while to inquire into the best mode of employing so essential and powerful a means; and this is the more necessary, because, like other means, capable of great good, it is also capable of great injury. Its beneficial effects have naturally led to too incautious a use of it; by which much mischief has been done, and the medicine itself, with those who either lack opportunities or correct powers of observation, brought into discredit.

The result of my own experience (and there are few whose attention has been more directed to the subject) is, that, although there are many circumstances under which large doses of mercury are not only beneficial but essential, the quantity, as I have already had occasion to state, employed in this country, has on the whole been, at least ten times greater than that from which its most beneficial effects would accrue. It unluckily happens

that, in a large proportion of cases, its most beneficial employment is not always that which produces the most immediate benefit; and in grasping at too much, we often not only lose the advantages it is capable of bestowing, but convert it into a source of mischief.

It is a law of its action, that when it is directed to one outlet, it is less inclined to pass by others; thus, when it is passing off rapidly by the skin, which is known by the scarcity of urine,—if, in consequence of taking cold, or an increased quantity of the medicine, it is thrown on the salivary glands, the usual secretion of urine is restored, indicating that it is no longer powerfully exciting the skin; or perhaps increased, for the salivary glands affording but a narrow outlet, it still in part tends to pass by other channels. It seems to be on this principle, that salivation renders it more powerful with respect to the disease, and particularly that diuretics which did not previously excite the kidneys, now have this effect; but mercury seldom produces salivation unless the system be highly impregnated with it, and then—to say nothing of the irritation occasioned by the salivation itself, which is often great—its sedative effect is frequently much felt, and the whole powers of the constitution are, for the time, enfeebled by it.

It was a maxim of the older practitioners, that its beneficial effects are proportioned to the degree of salivation it occasions; and I have heard the late Dr. Monro, of Edinburgh, state the quantity of saliva which must be discharged daily, in order to eradicate particular affections. Can we be surprised that, when such maxims prevailed, the remedy proved sometimes worse than the disease, and that so strong a prepossession against it has arisen?

I HAVE said that before salivation takes place, the system is generally much impregnated with the medicine, for this is not always the case. In particular constitutions the smallest dose immediately affects the salivary glands. Thus, in general, although we find mercury most effectual when it produces salivation, in some habits this occurs so readily as wholly to preclude its employment, and consequently to render it useless as a remedy. In others the same consequence ensues from the sedative effect immediately arising from such minute doses that, from this cause also, its injurious effects alone are attainable.

The following are the most remarkable instances of these peculiarities which I have met with. From the fear of hurting the feelings of individuals in the few remarkable cases I shall have occasion cursorily to relate, for the purpose of illustration, I shall abstain from giving the names. This is the more necessary, because in a large proportion of these cases the patients were members of families well known to the public. I am ready, however, to state them, and any other circumstances of the cases, to any respectable practitioner.

I was requested to see a lady, whose apothecary informed me that, although her case was bilious, she had been obliged to abstain from mercurial medicines, in consequence of only half a grain of blue-pill—and that after she had for some time recovered from the effects of former doses—having occasioned salivation. Finding that her mouth at the time I saw her had been well for some weeks, I advised him to repeat the mercurial, but still to lessen the dose. She took a quarter of a grain of blue pill on going to bed, and the next day was in a state of salivation.

In the following case, the degree of sedative effect

produced by all mercurials, equally precluded their employment. A lady had long laboured under bilious affections, which were gradually impairing all the powers of her constitution. The cause of their obstinacy was, that she was incapable of bearing even the smallest doses of mercury without a degree of irritation and depression which had precluded its employment; and no other means had been found an effectual substitute for it. Calomel, on the whole, seemed to produce less depression than the blue pill; and after many other trials, in which the dose was more and more reduced, her husband and myself, that we might be assured of the accuracy of the medicine, saw one grain of calomel equally distributed among eighty pills of extract of liquorice. One of them was given to the patient without letting her know that it contained any mercurial, and in two or three hours she said she knew she had taken mercury, for she felt the symptoms which nothing else ever produced. She afterwards visited various parts of England, for the sake of change, and was under the care of various physicians, who all attempted to find some mode of exhibiting mercury which she could bear, but in vain; and her disease proved fatal, for no other reason than that she was unable to bear the only effectual means of relief; for, in the first instance, it was nothing more than the common bilious affection which, in the beginning, in most constitutions yields with certainty to a very moderate use of this medicine; but even this slight affection we had no means of arresting without it, so that it gradually preyed upon the constitution. The diseased action of the liver by the laws of sympathy extended to other organs, and at length destroyed all the powers of life.

No case can more strongly evince the value of the medicine. This lady died because her constitution was wholly unsuited to it, and we had nothing which could supply its place.

Those who are prepossessed against it and other powerful medicines, in their fear of the medicine are too apt to lose the fear of the disease. They are insensible to the risk of delay, which often by the power of habit and the sympathies of the constitution, converts a disease of easy cure into one altogether hopeless.

THE effects of mercury, we have seen, may be divided into two classes—its local and general effects. Many of its effects, both good and bad, depend on its operation on the parts to which it is applied. It may appear at first view extraordinary, that any of the effects of mercury should arise from its action on the particular part of the skin to which it is applied, and any effect which can be ascribed to this cause I believe to be very slight; but, under certain circumstances, it is sensibly felt. We know, that, however free from any direct communication, either by nerves or vessels, neighbouring parts of the animal body may be, they never fail to sympathise: one among many proofs that the power of sympathy is referable to the central parts of the nervous system: and, although a mercurial plaster worn on the region of the liver, be too feeble a remedy to be sensibly felt in a case of severity, and where more powerful means are employed; yet, in removing the last remains of debility of the liver, and in preventing its return I have found it a means of considerable efficacy; and have known instances where health



was preserved by it, and the patient constantly had a recurrence of bilious symptoms on laying it aside. I am inclined, from what I have seen, to ascribe a great part of the effect of this remedy to the local effects of the mercury in the neighbourhood of the liver. A very minute portion of the mercury, no doubt, is absorbed\*; but many times the same quantity thrown into the system in any other way, would not produce the same effect. To the same cause we must, I think, in some degree ascribe the greater efficacy of mercurial friction on the region of the liver in confirmed organic disease of that organ, than of any other way of employing this remedy. Something here is doubtless to be ascribed to the friction; but I believe the same friction on this part will not render other modes of exhibiting the medicine equally efficacious.

Whatever may be said of the local effects of mercury applied to the skin, there can be no doubt of its local effects, both good and bad, when applied to the stomach and bowels; and I shall say the more on this subject, because I have found it one of the points of most consequence in regulating its employment.

It is this circumstance which appears to render the internal so much more beneficial than the external use of mercury, where it is not our object to produce any considerable impregnation of the system.

We have a familiar instance of the effect of the local action of mercury, on the stomach and bowels in controlling the action of the liver, in that of a few grains of calomel allowed to pass through the canal, however

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\* I have seen the gums affected by a mercurial plaster.

rapidly, in emptying the ducts and restoring the due secreting power of this organ. To the same cause I ascribe the greater efficacy (which I have ascertained by many trials) of the same dose when an aperient is taken six or eight hours after the mercurial, than when it is taken with it ; in which case, it is too much hurried through the stomach and first intestine to produce its full sympathetic effect on the liver.

Hence the good effects of the usual practice of giving the mercurial at night, and the aperient in the morning. A few grains of blue pill given at night, and carried off by an aperient in the morning, will have a decidedly greater effect in restoring the action of the liver, than when the aperient is taken with it ; although the mercury may remain as long in the canal. In the latter case, it is conveyed more quickly to the lower bowels, which have not the same sympathy with the liver as the stomach and duodenum have. With calomel the difference, though still perceptible, is less evident ; because the calomel, by its own action, passes more quickly than the blue pill, and is on this, as well as some other accounts, as I shall have occasion more particularly to point out, a less beneficial alterative.

This mode of employing mercury was very generally adopted by Mr. Abernethy. He gave a few grains of the blue pill every second night, and carried it off by an aperient in the morning ; and his employment of these means was so general, that he has been accused of an almost indiscriminate use of them. How far this accusation is well-founded, it is difficult to judge ; but many who smiled at his practice, were less acquainted with the laws of the animal economy. He knew, and has shown, in his excellent treatise *On the*



*Constitutional Origin of Local Diseases*, how various, and often even opposite, are the effects proceeding from the state of the digestive organs, depending on their extensive sympathies and peculiarities of constitution ; and he found his mode of exhibiting mercury powerful in relieving them, and his experience in this respect I have found amply confirmed by my own. But I shall, in a future part of this communication, attempt to point out the limit to which its efficacy extends, which he had not ascertained ; and the plan of treatment which must beyond this limit be adopted, in order to produce the same good effects. The two plans have this in common, that they are both arranged with a view to avoid the sedative effects of the medicine, which is an essential principle in its employment in all cases, except where life is in imminent danger ; and for want of other means such a contest between the disease and the remedy becomes necessary as sometimes almost makes it doubtful from which the risk is greatest. Such a use of mercury is only justifiable where we know the continuance of the disease to be certainly fatal.

From the local effects of mercury, little is to be apprehended, if the dose be not too frequently repeated. In this it resembles the effect of an emetic. If an over-dose be given, the only effect in general is, that it operates the more speedily and effectually. In this way, we may explain the alleged safety of doses of twenty or thirty grains of calomel, of which I have no experience, but which, some years ago, were not unfrequently given in this country ; the rapidity with which they were carried off compensating for the greatness of the dose. Various accidents, however, may render such excessive doses unsafe, and I believe

they are now little employed, and that, in this country at least, all their good effects may be obtained by much smaller quantities. It is from the constitutional operation of mercury, however—or I would rather say its constitutional and local operation combined, the former always more or less including the latter—that its most important effects, whether good or bad, arise.

It is a remarkable fact, that as there are some constitutions in which mercury, as we have seen, even in the smallest doses, acts as a poison, there are others which will bear an excessive use of it without injury ; as in some the sedative effect arises from the most minute doses, in others it seems incapable of any great degree of this effect in the largest quantity in which we ever employ it. The following is the most remarkable instance of this kind I have met with, which I shall concisely lay before the reader, before I enter farther on the principles on which this medicine appears to operate.

The patient was a boy of about twelve or thirteen years of age, labouring under dropsy of the belly. All diuretics had failed, and several gallons of water were drawn off from him by tapping. The liver was found indurated, and occupying a large portion of the flaccid abdomen, and the rest of it felt like a cluster of grapes ; so much enlarged and indurated were all the abdominal glands. In about eight days, although the patient drank but little, a collection of water to the same amount was formed. Such had been the rapid absorption of moisture from the air by the skin and lungs, the only source from which it could be derived. All diuretics still failing, I then, in conjunction with

a well-informed and highly-experienced apothecary, told the father of the patient that the only chance of recovery was a mercurial course, carried as far as the constitution could bear. I warned him that its effects would be severe, and its success doubtful; and proposed a consultation of physicians before entering on the plan. This he declined, and placed his only child wholly in our hands. The patient was of a scrofulous habit, which I have, contrary to what we should at first view have supposed, generally found favourable to the use of mercury. It may easily be supposed that, under such circumstances, I mean from the obstructed state of the absorbent system, we found great difficulty in producing an affection of the mouth. The apothecary, although advanced in life, and in the most extensive practice, had never seen so great a quantity of mercury used as in this case. It was used both externally and internally.

As soon as the mouth became decidedly affected, the diuretics began to act; and in the space of some months the whole of the water was discharged in the natural way. But we had an obstacle to contend with, which still threatened a fatal termination. As often as we attempted to lessen the mercurial influence, the water again began to collect. This I regarded as proving the glandular obstruction not to be yet wholly subdued, although the abdomen had now the natural feeling to the hand; and the question was whether the patient could bear the mercurial course long enough wholly to subdue it. In the meantime we were encouraged to proceed, as his strength, as well as his health, continued to improve under it. In all, he was kept in a state of salivation for a year and a half, before it was possible to

lay aside the mercury without a return of the disease. At the end of this time he was free from the complaint, and remained so without the further aid of medicine. But the most remarkable circumstance of the case was, that, although he had always been so sickly a child, that from his birth there were hardly any hopes of rearing him, he became, after this course, one of the stoutest and healthiest young men I knew; and the only bad consequence of so unusual an employment of mercury was the loss of two or three of his grinders, which came out during the long-protracted salivation. No case can more strikingly illustrate the power of mercury in glandular disease, under which it was evident this boy had laboured from birth.

IF we except the function of propelling the blood, all the functions on which life depends take place in the minute extremities of the nerves and blood-vessels; and even the motion of the blood in the immediate organs of those functions depends on the vessels employed in them, and in no other respect on the heart and larger vessels than that from them they receive their supply of blood. Till the supply fails, the circulation goes on in the capillaries, even after what is called death; and with the same vigour, although a ligature be thrown round all the vessels attached to the heart, and this organ cut out, as when the circulating system is entire\*. Hence the emptiness of the larger arteries some time after death; and if the capillary vessels of any part, during life be deprived of their power, by causes confined to them, the blood immediately becomes stationary in

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\* Inquiry into the Laws of the Vital Functions.

them, although the heart and every other part of the animal be entire and vigorous \*.

Now the great value of mercury arises from its influencing the action of the extreme parts of the nervous and sanguiferous systems more powerfully than any other medicine we possess ; and to the same cause, as appears from what has been said, all its injurious effects, with the exception of the sedative effect, in which it appears to operate on all parts of the system, may be ascribed. It is by its effects on the extreme vessels and nerves, that it effects the cure of such cases as that just described, and the discharges by which it debilitates are from the skin and other secreting surfaces. It is by its effects on secreting organs that it occasionally causes so much irritation ; and the greater liability to the effects of taking cold, produced by it, is from the open state it maintains in them.

Let us inquire under what circumstance it is most apt to produce its various effects, and by what means the favourable may be secured, and the unfavourable guarded against.

ITS rapid effects on the extreme parts of the nervous and sanguiferous systems, and particularly in the liver, render it a powerful means of temporary relief under a variety of circumstances ; and the permanency of its effects, under proper management, bestows upon it great power as an alterative.

Of its various preparations, some are better adapted to the former, others to the latter effect. Calomel is best adapted to produce the more rapid effects, par-

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\* Inquiry into the Laws of the Vital Functions.

ticularly the sudden excitement of the liver and the secreting surface of the alimentary canal ; but its milder preparations answer better as an alterative. Peculiarity of constitution is sometimes as remarkable in the different effects of its particular preparations as in the general effects of the medicine itself. In some, the smallest dose of blue-pill occasions nausea. I have almost always found, in such cases, that the stomach bears calomel better : but it is more apt to irritate the bowels ; and from this cause, and probably its passing more quickly along the alimentary canal, it does not answer the purpose of an alterative so well. The tendency of mercurials to oppress the stomach is generally found in the opposite proportion to their activity. Blue-pill is lighter than the hydrargyrum cum creta, calomel than blue-pill, and oxymuriate of mercury, which can only be given in extremely small doses, will often agree with the stomach when all other mercurial preparations oppress it. It is only, however, in a few constitutions that the blue-pill, especially in small doses, has much of this effect ; and it is, on the whole, the most convenient, as well as effectual alterative. It is more effectual, than the hydrargyrum cum creta, without being much more inclined to irritate the bowels, and it has much less of this tendency than the more active preparations. It may be worth while to mention that in some constitutions it is apt to excite pain in the stomach, which seems to arise from a degree of spasm. But this symptom is never considerable, and chiefly felt on first using it. I never saw any consequence of importance arise from this pain, and it is generally of short duration, and soon ceases to recur.

On the more temporary effects of mercury, I need not



dwell. Every medical man is aware of the benefit often derived from suddenly exciting the liver and determining the fluids downwards by its operation on the extensive surface of the alimentary canal. Here, except in constitutions peculiarly sensible to its sedative effect, any injury that may arise depending simply on the irritation and discharge it occasions, may be lessened by its less frequent employment ; but the chief difficulty in this employment of it, is to judge when its peculiar effects are obtained, and we are called upon either to abstain from it altogether, or employ it in a different way.

The sudden advantage often obtained by this mode of exhibiting mercury is flattering both to the practitioner and to the patient ; and I have often seen it persevered in when its debilitating effects greatly exceeded any advantage derived from it. From the nature of this mode of employing it, the benefit derived from it must always be greatest at first, when the accumulations, whether of blood or vitiated secretions, are greatest, and the patient's strength most entire.

After the due distribution of the blood is restored, and the vessels of the liver emulged, there is nothing more to be expected from the temporary effects of this medicine. It is only necessary to renew them when the evils which called for them recur. If the removal of these evils do not restore the patient, we may be assured that he labours under a permanent derangement of function somewhere, if not of structure also, which may be aggravated, but cannot be counteracted, by such means ; and that if the fault be such as mercury is capable of correcting, it must be by rendering the effects of the medicine, like the disease it is intended to relieve,

more permanent. We must abandon the hope of doing much in a little time, and attempt by gentler means to solicit a return of the healthy action. Under such circumstances the practitioner always finds that as the benefit of his active doses is lessened by their repetition, their debilitating effects increase, and soon begin to compensate, and at no great distance of time more than compensate, for any advantage derived from them. He is thus obliged to relax his plan, and not unfrequently wholly to lay aside the medicine, before the disease is subdued.

Many of the same observations apply to an alterative course, when the doses are considerable. If these also fail to afford permanent relief, and the disease be one of immediate danger, requiring the prompt and powerful effects of mercury, and such as no other medicine can produce, the chance of recovery is at an end; and we have nothing more in our power than to husband the remaining strength, and contribute to the patient's comfort for the short time that he has to live; but if the disease be more or less of a chronic nature, we have still a resource. Time may be given to effect by degrees what cannot be effected rapidly.

The question is, whether in lessening the dose of the medicine, we lose as much as we gain; whether in rendering it less debilitating, we in the same proportion render it less effectual. This we have reason to believe is in a great degree the case with respect to each particular dose; it is not, however, wholly so, because by lessening the dose we lessen the tendency to the sedative, and increase that to the stimulant, its only wholesome operation. But the greatest advantage we gain is that of being able without injury to repeat the dose more



frequently, and however small may be the beneficial effect of each dose, if we can give another before that effect is wholly lost, the benefit necessarily accumulates.

Such are the principles which gradually led me to minute, and frequently repeated doses of mercury. It remains to consider more particularly their *modus operandi* as compared with that of larger and less frequently repeated doses, and point out the cases in which I have found them most beneficial.

## CHAPTER II.

## OF THE MODUS OPERANDI OF MINUTE AND FREQUENTLY REPEATED DOSES OF MERCURY.

I HAD occasion to observe, in speaking of Mr. Abernethy's plan of exhibiting mercury in diseases of continuance, that when it fails there is another which is often successful. This consists simply in greatly lessening the dose, and in the same proportion increasing its frequency.

The benefit derived from this change depends on the most fundamental laws of our frame. I have already had occasion to point out that all agents capable of affecting the living animal body act both as stimulant and sedative, according to the quantities employed; and we call them by one or other of these names, according as they are best fitted to produce the one or other effect.

Spirit of wine we call a stimulant, because in all moderate quantities it produces the stimulant effect; but there is a quantity of it, as appeared in the riots of Lord George Gordon, when many of the mob took draughts of spirit of wine, mistaking it for common gin, which produces instant death without any degree of previous excitement. Digitalis we call a sedative, because in ordinary doses it acts as such, but it appears from very accurate experiments that in extremely minute doses it acts as a stimulant.

Mercury is one of those agents in which the stimulant and sedative effects are so nearly balanced that neither

predominates so much as to obtain for it either appellation, but it observes the same law as all other agents capable of affecting the living animal body. In small or moderate doses the stimulant effect prevails; in excessive doses the sedative; and the repetition of even moderate doses, unless at very distant intervals, seldom fails at length to produce more or less of the latter effect. Is there a dose, then, so small as to produce little or no sedative effect, and yet capable of the stimulant effect on which we have reason to believe the beneficial tendency of this medicine always depends? Is there a dose from which, in most constitutions, the sedative effect either does not take place, or takes place so slowly that the cure may be far advanced before the patient begins to experience any degree of it?

The result of my experience is, that there is such a dose.

With respect to its amount, it varies from half a grain of blue-pill, the largest dose, except in peculiar circumstances and constitutions, I ever employ with a view to the alterative effect in chronic cases, to the eighth part of a grain, the smallest dose from which in general much good can arise, though there are cases in particular constitutions in which I believe much smaller doses than even this will be found beneficial; and the interval at which the dose has been given is from six to eight hours. By these doses, given at such intervals, we can in most constitutions, and for a considerable length of time, in some for an unlimited time, obtain the stimulant without the sedative effect of the medicine, which ought to be the great object in the employment of mercury. We thus, as far as the particular constitution is capable of it, secure the whole of its beneficial, without any degree of its injurious effects.

As soon as the sedative effect is perceived, which, we have seen, is known by its producing a state of irritation and debility, this effect except in extreme cases must either be obviated or the medicine laid aside ; for nothing but its being essential to the immediate preservation of life, will compensate for the sedative effect of this medicine, whether produced by large or small doses. It is eventually, if too long maintained, as certainly injurious as the disease ; but as in the case of the medicine it is always in our power to remove the offending cause, in the hands of a prudent practitioner we have the chance of benefit without the risk of permanent injury.

With respect to the minute and frequently repeated doses, I would say without hesitation, and from ample experience, that in all cases except where the great discharges, or other rapid effects this medicine is capable of producing, are required, they are not only the safest but the most effectual mode of exhibiting it. Their operation appears to be that of a gentle but constant stimulant ; exciting to due action the various organs of assimilation, and particularly the liver. When I first adopted this practice many regarded it as nugatory, not believing that any sensible effect could be obtained from such doses. This mistake, however, I believe, is now very generally corrected. The following case is strikingly illustrative of their power in producing the peculiar effects of the medicine, and I could add many others of a similar nature.

A lady came from a great distance to London, for the purpose, she said, of being salivated : which she had been told would relieve her from a bilious complaint, under which she had laboured for many years.

For this purpose, she had taken, in vain, in the country, very large doses of mercury, much beyond the

largest usually given in this climate. I saw no occasion for salivation, but directed for her, with other means, half a grain of blue pill three times a day. Her case did not require frequent visits; and not being then so well acquainted with the effects of the plan, I thought, as the mouth had resisted such doses, that no precautions respecting it were necessary, when, at one of my visits, after she had taken the medicine for about a fortnight, I found her in a state of severe salivation; the whole of the face was swelled, and she was for a considerable time confined to bed. At no great distance of time she left London well; and I learned from her sister, who two years afterwards was placed under my care, that she remained so. This lady was thus permanently cured by a quantity of mercury, the whole of which did not exceed what she had taken in vain, for a great length of time, every two or three days.

It is not difficult to perceive the principle on which the power of the minute doses depends. From their little aperient tendency, they readily enter the system; and from the little irritation and excitement they occasion, they are not apt to be thrown off by it. Such cases as the preceding are not uncommon, and I could mention many in which a certain affection of the mouth arose from even smaller quantities. I have at this moment a gentleman under my care whose mouth has repeatedly been made sore in a few days by the sixth part of a grain of blue-pill taken three times a day, which in him had it been continued would soon have produced the same effect as in the preceding case. If the peculiar effects of mercury may be obtained in any degree we please by such doses what, as I have already had occasion to observe, can be the motive for employing larger ones, unless, either from the nature of the symptoms or the urgency of the case

the more active effects of the medicine, or the more rapid impregnation of the system be required ; or, as happens in certain diseases and constitutions, the powers of the absorbing vessels are so inactive that minute doses are incapable of exciting them, and therefore cannot enter the system ?

The chief cause of the minute doses sometimes producing an effect on the gums, when larger doses fail, arises from the latter being so much more powerful in exciting the excretories, by which, in certain constitutions, they are often thrown off as fast as they are taken, and thus little impression is made either on the mouth or the disease. It is to the thorough manner in which the minute doses are received into, and retained in the system, and the general, steady, and gentle impression they make, that they owe an efficacy which surprises those who have not been accustomed to see their effects.

Such doses, of course, have little effect in suddenly emulging the biliary ducts, and thus discharging collections of vitiated bile ; and until they succeed in restoring the due action of the liver, which in general requires some time, these collections are more or less apt to form under their use, and occasionally to require the operation of a more active mercurial, the necessity for which is different in different cases, according to the tendency to such accumulations. Where there is no tendency of this kind, the active dose is unnecessary, and its frequent repetition is seldom proper. Calomel, we have seen, generally answers the purposes of this dose better than the blue-pill ; although, in the more obstinate cases, I have found a combination of the plan I am now describing and that of Mr. Abernethy, the most successful.

## CHAPTER III.

OF THE CASES TO WHICH THE MINUTE AND FREQUENTLY REPEATED DOSES OF MERCURY ARE ADAPTED, AND THE CIRCUMSTANCES TO BE ATTENDED TO IN THEIR EMPLOYMENT.

I AM now to point out more particularly the cases, both acute and chronic, in which I have found minute and frequently-repeated doses of mercury most successful ; and the various circumstances to be attended to in their exhibition. I shall, in the first place, speak of the chronic cases. In them I was first led to this use of mercury, and its effects in them gradually led to it in acute cases.

## SECTION I.

*Of the Employment of Minute Doses of Mercury in Chronic Diseases.*

IT appears, from what has been said, that the cases in which mercurial medicines are most successful are those (a very numerous class) in which the state of the liver is more or less essentially concerned.

Indigestion, which forms an important part of so many chronic diseases, either as a cause or a consequence, generally begins, when it is the original disease in this country, with debility of the stomach, which spreads to the liver and duodenum, and thence, more



or less, to the rest of the system. While it is confined to the stomach, it is for the most part readily relieved by a proper attention to diet, the state of the bowels, and what are called stomachic and tonic medicines. If not relieved, the debility always spreads to the liver.

The disease, being then of a complicated nature, begins to obey different laws. The various affections of each organ by sympathy influence the other, and the evil proceeds in an increasing ratio, and will no longer yield to the simple means, in the first instance generally successful.

The action of the stomach is now more impeded by the effects of the disordered liver—an organ of more important sympathies than the stomach\*, and which must be restored before the latter can recover its tone—than by its own original debility; and thus, in cases of long standing, the cure depends more on the relief of the liver than of the stomach itself. The affection of the former renders the symptoms not only more complicated and severe, but more obstinate also. It is the chief impediment in our way.

The greater part of the suffering in such cases, indeed, depends more directly on the state of the liver than the stomach, arising from its influence on the centre of nervous power, and the action of the first intestine immediately depending on the state of the bile. The state of this intestine is the best, and, as far as I know, the only accurate measure of the due action of the liver. In proportion as the bile deviates from its healthy

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\* In a paper I lately had the honour to present to the Medical and Surgical Society, I have considered at some length the sympathies of the liver, and the circumstances which render them so important.

properties, the action of the duodenum languishes; it fails duly to carry on its contents, allowing the imperfectly digested food to accumulate in it, which causes a fulness in the region of this organ that may always be readily distinguished by comparing it with the corresponding part of the left side, and proving a source of a great part of the nervous irritation which attends protracted cases of indigestion\*.

As the state of the region of the duodenum is here the best measure of that of the liver, it is necessarily the best measure of the effects of the alterative. As the languor of the duodenum arises from a vitiated state of the bile, it is reasonable to suppose that a more healthy bile will relieve it; and we find, in fact, that precisely as the due action of the liver is restored, the activity of this intestine returns, an effect not to be procured by any ordinary aperients, however powerful, and without which it is in vain to expect any material abatement in the symptoms of the disease.

Now it is under such circumstances that I have found the minute and frequently-repeated doses of mercury so effectual in indigestion, and the various cases which arise from, or are supported by, this state of the digestive organs; and in the more obstinate cases in which habit has confirmed the disease, the larger doses, necessarily given at longer intervals, almost

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\* This subject is fully considered in my Treatise on Indigestion, and my reasons pointed out for believing that the fulness in question arises from the state of the duodenum. But whether it arises from the state of this intestine or not, I know, from the careful observation of more than twenty years, that its degree may be confidently relied on as a measure of the state of the secreting power of the liver, and I believe there is no other such measure: the colour of the bile and all others I have found more or less fallacious. By practice the hand becomes sensible to the slightest morbid fulness of the region in question.

uniformly fail, so that it has been customary to regard such cases as incurable ; and when the disease is confined to the digestive organs, the patient is advised to be cautious respecting diet, keep the bowels regular, amuse the mind, and think as little of his complaints as he can—the last an attempt in which he is generally most unsuccessful ; for, from the great sympathy between the liver and brain, he generally broods over them, till, by degrees, they occupy his whole attention. Here, in such cases, is the limit at which I have found Mr. Abernethy's plan almost uniformly unsuccessful, and where the employment of the minute doses, as far as I know, is the only effectual means of relief.

I have, in my *Treatise on Indigestion*, been at great pains to point out a change which almost always takes place in the progress of that disease, and, if we except the state of the liver, more than any other circumstance, influences the treatment of protracted cases. The long-continued nervous irritation which attends it, here, as in all similar cases, produces more or less of an inflammatory tendency, and a tenderness on pressure is generally perceived in the region of the pylorus and left edge of the liver. The pulse always becomes more or less tight, and the patient often, especially in the evening and early part of the night, experiences more or less tendency to increased heat, which frequently shows itself in a burning of the hands and feet, although this tendency is by no means so uniform a symptom as the tight pulse. The state here described essentially influences the effect of the mercurial as an alterative, and when it prevails to a great degree, is comparatively of little avail till it is relieved.

Every practitioner has remarked the proneness of

mercury to produce a feverish state, and that in inflammatory cases it is chiefly useful when given in such a way as to occasion a copious discharge from the bowels which compensates for this tendency. The larger the dose, this effect is the more felt; and it is one of the advantages of the minute doses, that they have little tendency to increase the inflammatory disposition.

I have found the tightness of the pulse, in whatever degree, no obstacle to the exhibition of the minute doses, which never appear to increase it, and often, especially when they act much on the skin, sensibly relieve it; but when the inflammatory tendency goes so far as to occasion much tenderness in the region of the pylorus and left edge of the liver which lies upon it, where the tenderness always in such cases, for reasons explained in the treatise just referred to, first shows itself, the operation of the alterative is greatly impeded, and it is necessary by local means to relieve this tenderness, in order to obtain its usual good effects.

It is of great consequence in all plans of treatment, to render them as effectual as possible on their first employment. When the means are of an active nature there is a necessary limit to their repetition; and where they are such as may continue to be borne without injury, their effect is impaired by their continuance. The constitution becomes accustomed to the favourable as well as unfavourable effect of medicines. The first impression is always the most powerful.

In having recourse to the minute doses, of the alterative, therefore, we must correct as quickly as possible all the causes which counteract their operation. Besides, in many habits, their long-continued use gives rise to more or less of the sedative effect, which, when it once occurs, is always more readily produced afterwards.

The good effects of the alterative in chronic cases is generally felt within six or eight days, and sometimes in two or three. In other cases it is much longer before it appears, and I have often seen it completely successful where several weeks elapsed before any decided change for the better took place. The relief at first, in some cases, is such that the patient supposes he is about all at once to be restored ; but sudden and permanent relief never happens in cases of long standing, and the physician is made aware that such sudden relief will only be temporary, by finding that the fulness and tenderness of the regions of the pylorus and duodenum are little abated. The symptoms, even where the temporary relief has been greatest, generally again increase, although seldom to the same degree as before this temporary relief. When the relief again comes, it is always more gradual, but if the treatment be properly conducted, this second abatement of the symptoms is almost always permanent. In the majority of cases, the more tardy abatement alone takes place. The temporary relief seems to arise from the first effect of the alterative enabling the vessels of the liver suddenly to throw off some part of the accumulation which had oppressed them. But it is evident, that, till time is given for the vessels in some degree to regain their vigour, the same state of the part must to a greater or less degree recur.

Of the means of relieving the tenderness of the epigastrium, local blood-letting is the most powerful ; and it is of great consequence to abstract the blood quickly and as much as possible from the most tender part.

I have had occasion to refer to that law of our frame by which all neighbouring parts sympathise. In bleeding from the skin in the neighbourhood of a diseased

organ, we take no blood directly from the vessels of that organ, but they so immediately partake of the state of the neighbouring vessels, that a few ounces of blood taken from the latter will often give greater relief in local affections,—particularly those of a chronic nature, which depend more on the distension of the vessels of the part than any morbid increase of the force of circulation,—than many times the quantity taken from a distant part, and which can affect the diseased part only through the general circulation. I have even repeatedly found, that, in those cases where the tender part is one of considerable extent, the relief from the local blood-letting has been chiefly felt in its immediate vicinity ; so that it has been necessary to repeat it, in order to relieve other tender parts of the same region.

Every practitioner is aware of the essential difference in the effects of blood-letting and blistering in acute cases—the one being better calculated to relieve the distension of the vessels, the other to excite them to a due performance of their function ; and in cases of great excitement the latter, without the necessary previous blood-letting to reduce the general excitement, is often even injurious, by tending to increase that excitement.

In chronic cases, where there is little increased excitement, these different tendencies are less apparent, but they equally exist. In proportion as the tenderness is great, local blood-letting becomes the more beneficial ; and in proportion as it is trifling, and the lesion of function great, more advantage is to be expected from blistering. To this observation, however, there is one exception : local blood-letting, like all other remedies, loses its effect by frequent repetition. The sympathy



by which its effects take place, active at first, becomes weakened in protracted cases ; and did it still equally operate, the vessels of the part, by long-continued or frequently-repeated distension, have their contractile power impaired, and often become incapable of maintaining the healthy diameter against the force of the circulation, even when they are capable for the moment of attaining it. Thus it is that in old cases, even when the tenderness continues to be great, or great tenderness has frequently recurred, local blood-letting often proves to be of little service. Whatever be the degree of tenderness, therefore, blisters are then the appropriate remedy ; and if they have not frequently been repeated are generally in a greater or less degree successful, when local blood-letting has failed. When in long-protracted cases both fail, a permanent drain from the part is often of service. This, however, is better suited to remove the last remains of the disease, and prevent its recurrence, than to assist while the symptoms are urgent.

If we cannot by such means relieve the tenderness, in the seat of the disease, the effect of the alterative will be greatly impeded ; but when the tenderness is not very great, the alterative itself, by exciting the part to the due performance of its functions, tends to relieve it ; and local measures will never, in the cases to which the alterative is adapted, finally subdue the tenderness without its aid. The deranged state of the secretions, its original cause, constantly tending to renew it.

In most cases the alterative may be greatly assisted in subduing it by other medicines. Even in the most chronic cases, where the tenderness is very great it is



generally accompanied by some occasional tendency to increased heat, particularly to occasional burning in the hands and feet; and however rare and of short continuance this tendency may be, it always more or less indicates the employment of some saline medicine; and nitrate of potash I have found by many degrees the most effectual. It sometimes, however, disagrees with the stomach, which in a few constitutions it is apt to do in a great degree. In almost all cases I have found its effect improved by the addition of a little mucilage, which tends to defend the stomach against its tendency to irritate. A large quantity of mucilage, whether animal or vegetable, generally oppresses, and I have known a few who were oppressed by the smallest quantity. In one case even five drops of mucilage of gum arabic always produced this effect. When nitrate of potash oppresses the stomach, I have found the common saline draught the best substitute. I believe it is rather less cooling, but more grateful to the stomach when made with soda than potash. The nitrate may be rendered more grateful to the stomach by giving it in a saline draught.

Saline medicines essentially aid the alterative, by more effectually subduing the inflammatory tendency. Where the recurrence of the heat is at all frequent, we shall with their aid succeed with half the quantity of mercury which is necessary without it.

The regulation of the saline medicine in such cases often requires great consideration. If more than is necessary is used, it tends to debilitate, where its constant employment is long required; and if the heats be allowed to recur, they not only essentially impede the cure, but debilitate more than the means which

relieve them. I have generally found from six to twelve grains of the nitrate of potash, given with each dose of the alterative, sufficient; and in the cases which require it, by reducing, and at length for the most part preventing, the recurrence of the heats, it has often essentially contributed to restore the strength; and in many cases, more than any opiate, to secure good nights; for it is in the nights, we have seen, and particularly in the early parts of them, that the heats are most apt to recur, and they never fail to occasion more or less oppression and restlessness. When there is no tendency to them, if the patient be tolerably vigorous, the effects of the alterative will still be promoted by its combination with small doses of saline medicine; but where debility prevails, unless the tendency to heat be considerable, they must be used with caution; and in cases where, as sometimes happens, there is a constant tendency to chillness, they are uniformly injurious.

These, we shall find, are among the cases in which stimulants and tonics are best borne, and of most use. In most cases, however, light stomachic medicines, when they have no heating tendency, should be combined with the saline medicine; they do not seem to impair its alterative, and, what is remarkable, unless they are of a very heating nature, or the constitution unfavourable, often very little, its cooling effect.

The effects of stimulants and tonics, in combination with the alterative, is greatly influenced by constitution; some patients bearing them a great deal better than others. Their due regulation is quite as essential as that of the refrigerants. Measures which reduce the excitement are only to be employed as far as they

are necessary ; those, on the contrary, which increase it, as far as they can be borne without injury.

The more purely stimulating medicines, the effect of which is immediate, and in a great degree transitory, particularly ammonia in its various forms, may generally be employed with little precaution wherever a sense of debility prevails, although there are some constitutions which cannot bear even these without increased heat and its usual accompaniment—a sense of oppression ; and I have seen many who greatly required a cordial thus wholly precluded from it ; for there is nothing more injurious, in the cases I am speaking of, than a perseverance in anything which has these effects. It never fails to increase the inflammatory, the worst tendency of such cases. In some instances where other stimulants cannot be borne, the fetid gums (which soothe the nerves) are borne without inconvenience, and prove highly beneficial. A combination of assafoetida and castor or galbanum I have, on the whole, found the best.

In almost all cases, except where there was much tendency to affection of the head, it has been found advantageous, whatever other means are employed, to combine with the alterative a slight anodyne ; for it is always of consequence to allay irritation, the source of the inflammatory tendency, and consequently of the heat and restlessness. It is on this principle that a slight opiate often assists the refrigerant. Hyoscyamus has appeared to answer best. It has little tendency either to obstruct the bile or impede the bowels. In some constitutions it is aperient, and even in doses of two or three grains may be used in place of other laxatives ; and in very irritable habits I have sometimes

found it the best. When a more decided opiate has been required, the compound powder ipecacuanha has appeared, on the whole, the best ; and Battley's anodyne liquor, the black drop, and the acetate of morphine, will sometimes agree with the patient, when simple opium or laudanum will not. Of these preparations, some suit one constitution, and some another ; and I have seen a few instances in which simple opium was the least offensive. Whatever be the opiate, it is only in very minute quantity that it is serviceable. I have known great advantage derived from a combination of hyoscyamus with the fetid gums, especially where the former was aperient, which has produced a degree of composure no other means afforded.

As there are some constitutions, which, in the cases I am speaking of, cannot bear the smallest doses of the most transitory stimulants, so there are others which can bear even the continued use of the most permanent ; which is extremely rare.

I cannot help here remarking that one of the greatest errors (and perhaps of all errors the most frequent) in the treatment of such diseases, is making general inferences from the effect of medicine in particular cases. The great principle of distinction between the practice in acute and chronic diseases, is, that the latter are infinitely more influenced by peculiarity of constitution. The causes which produce acute diseases are so powerful and sudden in their effects, that they obscure the operation of all concurrent causes ; and, let the constitution be what it may, the disease being the same, very nearly the same plan of treatment is applicable in all cases. In chronic diseases, the cause being less powerful, and operating less rapidly, its effects are essentially in-

fluenced by such causes. The most unobservant must perceive how much chronic diseases are influenced by situation, and particularly by change, or whatever else is capable of a powerful and more or less permanent impression; and yet peculiarity of constitution, for the most part the most powerful of all concurrent causes, is overlooked; and rules are laid down for the treatment of chronic diseases with the same precision as for cases of fever and inflammation. The little success which often attends the usual plans of treatment in the former, is in a great degree to be ascribed to this cause; for the same chronic disease in different constitutions, although there are general principles applicable to all cases, often in other respects require not only different, but opposite plans of treatment. This observation is more or less applicable to all cases requiring an alterative plan.

It is here as necessary, in each particular case, to determine the peculiarities of the constitution as the nature of the disease; without which, if the practice be successful, it is merely a matter of chance. With due attention to the constitution, and the circumstances in which the patient is placed, the practice may be rendered nearly as determinate, as in acute diseases.

In the greater number of cases, what are called tonic medicines, can generally be borne for two or three days without inconvenience; and even this temporary use of them, where the debility is great, is often of consequence; but if they be persevered in after they in any degree produce increased heat or restlessness, much injury accrues, as I have often witnessed, from the patient, or even the practitioner, not being aware that the injury proceeded from the tonic.

In some constitutions, where the frequently repeated

use of the tonic is too bracing, its less frequent employment is often serviceable. This is especially the case with the more tonic bitters, particularly after the use of the alterative. In such cases I have seen both the appetite and strength very quickly improved by moderate doses of such medicines as the compound tincture of gentian, in any of the distilled waters, taken once, or at most twice a day, at early hours, when its more frequent employment could not be borne. In other constitutions, even this use of any thing which deserves the name of tonic is precluded. Many attempt, by increasing the discharge from the bowels, to enable the patient to bear the tonic, and in some constitutions the object is attained; but in others, although the case be of the same nature, the attempt altogether fails—the patient is either unable to bear the free discharge, or no discharge is capable of obviating the injurious tendency of the tonic.

Of the more powerful tonics, iron is that which can be most generally borne and the carbonate and the ammoniated tincture have appeared to me the best preparations, where the source of the disease is in the digestive organs;—but the most powerful, and therefore the best in the few cases in which it can be borne, is the bark, sulphate of quinine, being by many degrees, its best preparation. This is hardly ever the case when a tendency to increased heat prevails, and very rarely when it does not; for even when this medicine shows no tendency to increase the heat, its continued use seldom fails to increase the restlessness and oppression.

I need hardly say, that, in the use of minute mercurial doses, as under all other plans of treatment, the state of the bowels requires constant attention, which is



rendered doubly necessary when the tonics are combined with them. It has already been observed, that the minute doses of mercury, although, as far as I am capable of judging, by far the most powerful means in cases of long standing, of restoring the habitual healthy action of the digestive organs, are ill fitted to carry off accumulations either in the hepatic system or the bowels; and that, on this account, the occasional employment of a more active mercurial is often necessary. This is almost always the case in the commencement of the treatment; but in some habits the alterative soon begins to produce its favourable effects, and further accumulation is prevented. In most cases, however, an occasional active dose is necessary throughout the treatment. This, I believe, is the only circumstance which, independently of the use of tonics, renders any very active measures with respect to the bowels requisite, unless the head particularly suffer; but there is no case in which attention to their regularity is more essential.

In a large proportion of instances, when we are obliged to depend wholly on artificial means to excite the bowels, which in chronic diseases is often the case, it answers better to excite them every second than every day. There seems to be always some degree of irritation, even where there is no pain, in the artificial excitement of the bowels, and it is generally a source of relief to the patient to let them rest on alternate days. Besides, the free and daily excitement of the bowels carries off the alterative more freely than is desirable in the use of the minute doses.

Here, in order that the principles of the treatment may be more fully understood, it is requisite for a little



to pause, to consider the necessary consequences of the well known laws of our frame, in the class of diseases I am considering; and I would particularly request the attention of the reader to what I am about to say, because in consequence of the neglect of those laws in the cases before us, the subject has been involved in no small degree of confusion, every one offering such remarks as his partial observation, and consequent defective views, have suggested.

REFRIGERANTS and stimulants more or less of a tonic nature, that is, whose effects are more or less permanent, we shall find, are the aids of the alterative, the call for which is inseparable from the nature of all diseases produced by long-continued causes of irritation, while various other aids are required only in consequence of peculiarities of constitution.

It is one of the best known laws of our frame, that any cause of irritation, if long continued, never fails to produce an inflamed state of the part on which it operates. If the cause be sudden and powerful, the inflammation is of an active, if slighter but of longer continuance in the same proportion, of a chronic nature; and different parts are more inclined to the one or the other. These positions are too familiar to require any illustration. If the cause operate on a part of small extent, and which little sympathises with other parts of the system, the effect is confined to that part; if on a part of powerful sympathy, either from its nature or its extent, the whole system soon feels the effect of the derangement. External inflammations of a certain extent, however active, may exist without fever; all active inflammation of vital parts is attended with it

In proportion as the inflammation. in the latter case, partakes of a chronic nature, the fever it excites is less ; and in the most chronic, the only febrile symptom is some tightness of pulse, generally, though not always attended with occasional returns of increased heat. Hence dissection often informs us that chronic inflammation of vital organs had existed where none of the more prominent symptoms of inflammation, either local or general, had led us to suspect its presence. Even in the most chronic cases of this kind, however, to which my attention has been long directed, I can say from experience that may be called extensive, some tightness of pulse always attends ; and unless the progress of the disease be extremely slow, or some powerfully counteracting cause is operating, there is always some increase of temperature, which frequently only appears after meals and in the evening or early part of the night, the times at which the circulation is naturally most excited ; and very frequently shows itself chiefly by some burning in the hands or feet.

On the other hand, while continued irritation always at length produces inflammation of an acute or chronic nature, greater or less according to circumstances, of the part on which the cause of irritation operates, and more or less general excitement, according to the nature, degree, and extent of the inflammation produced, and the sympathies of the part affected ; it always at the same time, either directly or as a consequence of the morbid excitement produced by it, more or less debilitates the functions of the nerves of the part ; and this debility, as well as the inflammatory tendency, spreads by sympathy to other parts. According to the tendencies in the particular individual, one or other of these

states of excitement or debility prevails ; both of which are in a greater or less degree felt by all. All are more or less debilitated, and in all we find the pulse more or less tightened.

This state of the pulse being the distinguishing symptom of the debility which arises from causes of long-continued irritation, prevents its being confounded by a careful observer with cases of debility arising from other causes, in which the pulse is soft as well as feeble, a distinction of great consequence in practice, because it is only in proportion as the pulse is tightened that debility indicates a tendency to organic disease ; a tendency, as I shall soon have occasion to point out more particularly, which never arises till the effect of the irritation has spread from the nerves to the capillary vessels, with which, in all the assimilating functions, they are associated ; and this effect often takes place very slowly, particularly when the cause of irritation operates on organs little inclined to disease of structure. These necessary consequences of the best established laws of our frame have not only been overlooked in studying the phenomena of disease, but so strong is prepossession, by some writers even denied when pointed out.

It is this tightened state of the circulation which, in the second stage of diseases arising from protracted causes of irritation, renders powerful tonics, (our chief reliance while the disease consists merely in an impaired vigour of the nerves of the part affected, generally the first effect of the irritating cause,) so injurious, and refrigerants so beneficial an addition to the alterative. Such, for example, is the state of the system which arises from the long-continued irritations of indigestion ;

and, if uninfluenced by peculiarity of constitution, its treatment is simple, and almost always, when steadily pursued for a sufficient length of time, provided the continued application of the causes of the disease be prevented, successful, if the disease has neither spread to other parts than the digestive organs nor produced change of structure in them, which rarely happens in our climate, unless the offending cause has been the excessive use of fermented liquors.

Thus the effects of causes of irritation, confined to particular parts, unless they be of a very slight nature, or the parts affected of little importance in the animal economy, soon extend to all, and in this state of general irritation, when any part is weaker than the rest, they are most felt by this part; and the affection of the part, thus secondarily influenced, always proves of the same nature with that of the part first affected.

When the latter consists in a mere state of nervous irritation, such is the former; and when the one, in consequence of the continued operation of the irritating cause, assumes an inflammatory character, the nature of the secondary affection undergoes the same change. But it undergoes another change at the same time, an attention to which is of the last importance in the treatment.

Whereas, while it is a mere nervous affection, in which case, as will appear from what I shall have occasion to say in the section on the process by which organic disease is established, there is no actual disease in the part, it ceases as soon as the original disease is removed; but no sooner is the state of the vessels of the part secondarily affected implicated, and thus its inflammatory nature established, than it begins to acquire an existence, which is, to a certain degree, inde-

pendent of the original affection, and will often not only proceed after the disease which produced it is removed, but is sometimes the chief cause of its removal : and the diseased action is thus wholly transferred from the one part to the other ; the sympathetic disease, although, while a mere nervous affection, only adding to the other effects of the derangement, but, as soon as it becomes actual disease of the part, influencing the original disease on the principle of an issue, but in a much more powerful degree. Thus local sympathetic diseases arise ; and even where the original cause of irritation, either from its nature or that of the parts on which its first impression is made, would not prove fatal by its effects on those parts ; it may terminate fatally by the secondary disease, of which it is equally, though more remotely, the cause.

Thus, for example, pulmonary consumption is a frequent consequence of neglected bilious complaints ; that is, of that state of indigestion in which the debility of the stomach has spread to the liver ; and so frequent is this consequence that, according to my experience, more than half of the cases of pulmonary consumption, which in Great Britain destroys thousands yearly, are of this nature ; and might with certainty be prevented by removing the cause of irritation before the nerves, which convey the effects of the irritation to the lungs, had essentially influenced the state of their vessels. While the cough and oppressed breathing are only sympathetic nervous affections, they will always disappear on relieving the bilious complaint ; but if the tenderness in the region of the stomach and liver has become considerable, indicating that the bilious complaint has assumed an inflammatory character, we may be assured that the affection which has sprung from it will soon

partake of this character also : and then, if the disease is not relieved, it may make such progress in the lungs as to render it independent of the affection which produced it, and which it then often relieves, so that the fulness and tenderness in the region of the digestive organs, observed in the early, often in such cases disappear in the advanced stages ; a change which, if the pulmonary symptoms remain unabated under the proper treatment, I have found uniformly fatal.

On the foregoing principles, I have in many instances seen the ravagés of this disease in families, in which many had fallen a sacrifice to it, finally checked ; for it is a curious and important fact, but one which as far as I have observed is without exception, that both species of consumption, namely, that which originates in the lungs, and that which originates in the digestive organs, are never found in the same family. Of many hundred families, I have not met with one in which both species of consumption have prevailed ; so that, although the symptoms to a superficial observer are the same, the disease in some families is of a much less fatal nature than in others. This form of sympathetic consumption can always be cured when the patient at the proper period can be induced to employ the necessary means, which consist of nothing more than those for the removal of the bilious complaint combined with mild anodynes, of which extract of poppies and digitalis have appeared to me the best, as far as possible to allay the irritation of the lungs, and such medicines as are required to relieve occasional symptoms.

There is another species of sympathetic pulmonary consumption, which, fortunately, is a rare disease, and which I shall soon have occasion to point out, of which



this cannot be said, because here we often have no means of relieving the original disease.

I have already had occasion to observe, that it is by means of the nervous system that the living animal body is formed into a whole, in consequence of which all parts are affected by the affection of any one. It is therefore through the medium of this system, as I shall soon have occasion to point out more particularly, that sympathetic diseases are established. But all parts of that system are not equally concerned in their production ; and although in such cases as that I have just been considering, a knowledge of the nature of the parts of the nervous system concerned in the production of the disease is of little consequence, in others it is so far from being so, that the necessary treatment wholly depends on this knowledge.

There is in our frame what may, in a great degree, be regarded as two distinct nervous systems, the sensorial and vital—the former, the source of those powers by which we are connected with the external world, the latter of many of those on which our existence depends. The sensorial system may be debilitated for a great length of time without endangering life, the organs of life having no immediate dependence on it ; but the debility of the vital parts of the nervous system cannot continue long without these organs suffering, and some of them, sooner or later, becoming diseased. The functions of the nervous system having been ill understood, its affections have been very imperfectly distinguished ; and both where the disease has originated in its vital parts, and where it has spread from the sensorial to those parts, danger is frequently unsuspected, till, in consequence of failure of nervous power, disease is esta-



blished in some vital organ ; for by the vital parts of the nervous system, that is, the ganglionic nerves and those parts of the brain and spinal marrow associated with them, the assimilating functions, on which both the functions and structure of all our organs depend, are maintained. In a paper which the Royal Society did me the honour to publish in their Transactions for 1827, it is shown that organic disease of the most formidable nature may be established in the lungs, even in a few hours, by impairing their due supply of nervous influence.

The powers of the ganglionic and sanguiferous systems are independent of each other, except as far as each is necessary for the maintenance of the organs of each. The assimilating functions are the result of the joint operation of these powers, which is confined to the minute extremities of both systems, where they are intimately blended. Thus it is, that in all cases of obstinate nervous debility, it is necessary to examine with care the nature of the functions chiefly affected. If these be the sensorial functions, and we find that there is little or no affection of vital organs but such as is evidently the effect of their derangement, whatever be the sufferings of the patient, and these, from the chief derangement being in the organs of the sensitive system, are often greater than where there is more risk, we may be assured that life is little, if at all threatened. If, on the contrary, the organs of life chiefly suffer, and that independently of affections of the sensorial system, especially if the course of the disease be more uniform than that of nervous affections usually is, however purely of a nervous nature the symptoms may be, and however little formidable, either in appearance to others or to the feelings of the patient himself, danger is to be

apprehended, and, if the pulse be decidedly tight, is not far distant \*. I have, in my *Treatise On the Preservation of Health, and particularly the Prevention of Organic Diseases*, entered at length into the nature, diagnosis, and treatment of such cases, the fatal termination of which I have often witnessed. Having been confounded with the less important nervous affections, their fatal tendency has been so much overlooked, that when it at length shows itself by a decided affection of some vital organ, it often finds the physician as well as the patient unprepared. This class of diseases are always complicated with—and, in those in whom the vital functions of the nervous system are naturally less vigorous than usual, often originate in—affections of the digestive organs. In all such cases, the aid of mercury is more or less necessary, but it can seldom be borne in the usual doses. I have here found the minute doses of essential service in regulating the state of the liver, and thus mitigating all the symptoms, even where the disease had not originated in the digestive organs ; and, where it has had this origin, successful in restoring health, when all other means had failed.

IN many instances, the sympathetic affection in diseases arising from long-continued causes of irritation, rather deserves the name of a symptom than a disease, and cannot therefore be said to change but modify the disease. Thus, for example, bilious complaints are sometimes attended with obstinate headach, even where there is little tendency in them to produce actual disease of

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\* I shall soon, in the Gulstonian lectures of the present year, have an opportunity of more fully illustrating the foregoing positions.

the head. In others, instead of the parched skin, its usual state in the second stage of such cases, it is constantly too moist. In some, instead of the usual tendency to a hot skin at this period, there is an obstinate sense of cold, and actual reduction of temperature throughout the whole body. These deviations from the usual course of the disease, like the particular seat of sympathetic diseases, are the consequence of peculiarity of habit, which we have seen so greatly influences the course of all chronic diseases.

I have found that all these deviations indicate a more obstinate disease than when the usual course, arising from the general laws of our frame just pointed out, is maintained. They depend on constitutional debility of particular parts, which always, as might be expected, adds to our difficulties.

It will readily occur to the reader that it is impossible, without too far deviating from the object of the present treatise, even to enumerate the various sympathetic diseases and occasional symptoms which supervene in cases of long-continued irritation. I have cursorily considered pulmonary consumption as a prominent example of such a disease ; and the headach and relaxation, and coldness of the surface I have enumerated, because they are those occasional symptoms which, more than any other, influence the employment of the alterative, and which, consequently, it will be necessary to consider more particularly.

I HAVE already had occasion to make some observations relating to the state of the bowels in the employment of the minute mercurial doses. It is remarked above, that it is generally better to allow the bowels,

under their use, to rest every second day. In some cases we find it otherwise. This is particularly the case where the sympathetic part of the disease is determined to the head. We have seen how much the liver, by its sympathy with the source of nervous power, influences the symptoms of disease, and cannot be surprised to find that affections of the head are frequently complicated with those of this organ ; and as the sympathy of the liver, on the other hand, with affections of the head is equally strong, the secondary affection particularly tends to aggravate and confirm the original disease ; an effect which it always more or less produces, whatever be its seat, provided it has not produced actual disease of the part\*. Hence the treatment of the secondary affection is doubly important, and it often considerably modifies that of the original disease.

When the secondary disease chiefly affects the head, the most guarded use of opiates is generally precluded ; even the hyoscyamus is objectionable. In such cases, neither the direct effect of the opiate, however small the dose, particularly if frequently repeated, on the brain itself, nor its effect in retarding the free action of the bowels, can be borne. They not only require a freer action of the bowels, but generally bear it well ; the derivation of the fluids from the head more than compensating for its debilitating effect.

All medical men must have observed the greater determination of blood to the head in debilitated states

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\* The difference of the nature of what I here call the secondary affection and actual disease, and why the former should tend to aggravate the latter to relieve the original affection, will more fully appear from what will be said of the process by which organic disease is established.

of the digestive organs. This, in general, has been ascribed to the distended state of the stomach and bowels, from flatulence and an accumulation of undigested food causing more than usual pressure on the descending aorta; and that this, in many cases and at certain times, adds to the evil, there can be no doubt, but that it is not the principal cause of the determination in question appears from the permanency of the latter, and its existence in cases where there is no morbid distension.

I have been at considerable pains, in the Treatises above referred to, to point out the cause of this determination, and have adduced such facts as appear to me to leave no room to doubt that it arises from irritation of the digestive organs, through the medium of the nervous system, debilitating the vessels of the head; in consequence of which they suffer a slight degree of distension from the usual force of circulation, and thus receive a larger than due proportion of blood. This principle appears to be one of extensive influence in the phenomena of disease; for I believe it would not be difficult to show that on it sympathetic diseases of an inflammatory nature, of whatever part, more or less depend; the part affected being determined by some peculiar sympathy, as in the present case, or other cause, rendering it more liable to be affected than other parts. I shall afterwards have occasion to consider this subject more particularly.

As it is requisite where the determination to the head is considerable to be more attentive than in other cases, to carry off any accumulation either in the liver or bowels, it is generally necessary, under such circumstances, during the course of the minute doses, more

frequently to have recourse to larger mercurial doses than in other cases ; and if by these means the head is not effectually relieved, they must, in the most inflammatory cases, be accompanied by evacuations from the head itself or its neighbourhood, by local blood-letting and blistering ; and those medicines which tend more effectually to lessen the force of the circulation, and determine to the skin ; for the latter purposes I have found the tartarised antimony the best, and where the affection of the head is rather constant than severe, it sometimes precludes the necessity of other means. Immersing the legs in hot water and the application at the same time of cold and evaporating lotions to the head, often afford temporary relief, by tending for the time to counteract the morbid determination of blood.

When there is little inflammatory tendency, and the headach is in a great degree a nervous affection, the medicines called nervous, of which in this case I have found valerian the best, are sometimes successful ; but their effects are very uncertain. In another species of nervous affection of the head, apt to supervene in chronic cases requiring the minute mercurial doses, which consists in a state of great nervous irritability, arising not from the mercurial, but the disease, I have found a combination of tartarised antimony and henbane by many degrees the most effectual means. It rarely fails to induce composure, and thus greatly to promote the beneficial effects of the alterative. In those cases in which the nervous irritation inclines to hysteria, and particularly when nervous difficulty of breathing attends, the fetid gums and ether are the best means.

Of the secreting surfaces, the skin, next to the bowels, most influences the progress of chronic disease ;



and from the state of this organ we can judge better of that of the particular constitution in diseases of long-continued irritation, and consequently of the measures most likely to suit it, than by any other means with which I am acquainted. While the system is under the influence of permanent failure of function, and still more of organic disease in any of the vital organs, it is usual for the skin to be much drier than in health ; and it is sometimes obstinately arid, and, particularly in children, even shrivelled. It is almost uniformly dry when any considerable inflammatory tendency prevails. In some cases, however, particularly where the derangement is only functional, and the inflammatory tendency inconsiderable, especially in those in whom the more purely nervous symptoms most prevail, it is found in the opposite state—almost constantly bathed in perspiration. In both cases the secreting power of this organ is debilitated, the sweat in the latter case being the effect of relaxation.

In functional disease, although the symptoms may be more frequently severe when the skin is dry, I have almost uniformly found them most obstinate when it is constantly, or almost constantly moist ; and I never, indeed, saw a case of this kind in which they did not prove more or less obstinate. We have means of almost certain success for bringing the system into a favourable state for the alterative, and assisting its effects when the obstacle is the inflammatory tendency with a dry skin ; but where the skin is constantly in a state of morbid relaxation, the alterative is generally very ill borne, being much more apt to produce the sedative effect ; and in such cases we have few means which either add to its power, or assist the patient in bearing it. The



whole train of anti-inflammatory, with the exception of a cautious use of local, measures, is generally out of the question. Even where there is a good deal of local tenderness, the patient bears them ill, and, fortunately, the constant discharge from the skin renders them less necessary. The great characteristic of such cases is nervous debility; and yet it generally happens that strengthening means are very ill borne, the oppression they occasion adding to the sinking and debility. For the most part, however, patients of this description bear them better than others, in proportion as they require them more. The most beneficial are such as tend to invigorate the skin, and restrain the discharge from it. I have found the sulphuric acid the best.

When it agrees with the stomach and bowels, it often proves an important resource in such cases. I have never found it necessary to discontinue the minute mercurial doses on account of it, but, on the contrary, it has often been the means of enabling the patient to bear them; nor do I recollect any case in which it caused them to gripe, although, if they have had this effect, it is apt to increase it.

In many respects, analogous to the change in the nature of the case indicated by the damp instead of the dry skin, is that indicated by the cold instead of the hot skin. In some, instead of the increased temperature of the second stages of diseases of long-continued irritation, which, for reasons which have been stated, is in the ordinary course of the disease, we find, either from peculiarity of constitution, or some other cause, generally, I believe, a more than usually debilitated state of the nervous system disturbing its course, an obstinate reduction of temperature. The skin is pale

and, measured by the thermometer, below the natural temperature, the patient constantly complaining of chilliness, which neither external warmth nor ordinary stimulants can permanently counteract. The observations just made on the effects of stimulant and tonic medicines in cases where relaxation of the skin prevails, are in a great degree applicable to the present case. But here our chief reliance is on a medicine which, notwithstanding its cordial, is from its diaphoretic quality, of very doubtful efficacy in the former case. I mean carbonate of ammonia, which in the case before us is an invaluable addition to the alterative. It is generally grateful to the stomach, and can be borne in considerable doses, from three or four to six or eight grains three times a day; and I can recollect very few cases in which the constant chill was not alleviated, and in most instances it has been wholly removed by it, and along with the chill that distressing and often irritating sense of debility which accompanies it. In some constitutions considerable doses produce a degree of irritation and restlessness which limits its employment, but this effect is rare where the temperature is less than natural. I beg to refer the reader to what is said in a section devoted to this medicine in the sixth and seventh editions of my Treatise on Indigestion.

Many other symptoms might be enumerated as influencing the disease, and, consequently, the exhibition of the alterative; such as frequent pains in the region of the stomach, which require anti-spasmodics, of which the subnitrate of bismuth is here the best, especially if they are most apt to come on after meals, and the application to the part of as great a degree of heat as the patient can bear, which rarely fails to afford temporary

relief: various affections of the skin, in which I have found the preparations of antimony, and small doses of Fowler's solution, the best assistants of the alterative. But such symptoms being of a local nature, and consequently less influencing the course of the disease, require less modification of the general plan of treatment.

These, and other details relating to the use of the alterative may appear tedious; but, except in the most favourable constitutions, which only now and then present themselves, an attention to them is essential to its success.

OF the effects of the alterative itself, with which we occasionally have to contend, we have seen, the griping, and other symptoms of irritation in the bowels, among the most formidable. In the majority of cases, fortunately, they do not occur. So great is the injurious effect of this irritation, that, if it cannot be allayed, the alterative, at whatever expense, must be abandoned; for such cases will bear no serious cause of continued irritation, and in the use of opiates, we have seen, we are greatly restricted. The henbane, like the rest, is often not sufficiently powerful in any dose that is not injurious. If neither this, nor any other opiate, in very small doses, will answer the purpose, we have no resource but, still lessening the dose of the alterative, trying a milder preparation, or increasing the interval at which it is given; and if these means will not leave such a dose as is still capable of making some impression on the disease, the medicine must be laid aside.

In chronic functional disease, I never allow the gums to become much affected. There is no occasion for so considerable an effect of the alterative; and anything

like salivation always does harm, where all causes of irritation are particularly injurious.

It appears, from all that has been said, that the injurious effects of mercury, depending on peculiarity of constitution, are of three kinds—the irritation of the alimentary canal, too great a tendency to affect the salivary glands, and a general state of irritation and debility arising from the sedative effect sometimes of even the most minute doses; and I frankly confess that I have never been able to discover any means of effectually obviating any one of these tendencies when they have existed in a considerable degree, which, particularly with respect to the two last, is fortunately very rare; and under such circumstances I have always found it necessary very soon to lay aside the medicine. On the unusual tendency to affect the salivary glands, little need be said; whether the alterative can be continued depends on the degree in which it exists, not on any means we possess of obviating it; it fortunately very rarely occurs in such a degree as greatly to interfere with the plan of treatment; and such a tendency to it as only shows itself slightly, and after a fortnight or three weeks, and is removed by discontinuance of the medicine for one or two days, is generally favourable. It is a proof that the medicine is well retained in the system, which is essential to its effectual operation as an alterative.

On the last head—the tendency to the sedative effect, which must always be watched with great care—it is necessary here to make some additional observations.

In some constitutions, we have seen, the freest employment of mercury seems to have little tendency of this kind; when this is the case, and it produces neither

irritation of the bowels, nor shows an unusual tendency to affect the salivary glands, we see the full powers of the medicine in restoring the functions of health, compared to which, in many chronic cases, those of any other we possess hardly deserve to be mentioned. But it is almost as rare to meet with constitutions thus admirably adapted to it, as with those which wholly preclude its use. I have laid before the reader a case of severe disease, requiring the largest doses, in which the constitution was thus favourable ; and shall presently have occasion to lay before him a case similar in severity, and the favourable state of the constitution, in which the minute doses were required for a great length of time.

Chronic cases of this kind are not unfrequent, because the minute doses, as we have seen, in proportion to the smallness of the quantity, are less apt to produce the sedative effect, however long continued—one of their greatest advantages. In the generality of constitutions this effect is seldom observed from them in the commencement of the course. In many instances, however, it sooner or later shows itself, and must be immediately attended to. When the sedative effect has once taken place, we have seen, still smaller doses are apt to renew it.

Such strengthening medicines as the patient can bear well, to a certain degree relieve it ; but I know, from a very extensive experience, that they seldom wholly prevent it when it exists to any considerable degree. They rather obscure than lessen the mischief ; and the mercurial, for reasons I shall soon have occasion to point out, ceasing to be a wholesome alterative, little or no progress is made in the cure. All medicines whose

sedative effect is exerted on the moving powers of the system alone, and in no degree on the sensibility, are hurtful as soon as this prevails over the stimulant effect, which alone is salutary ; and this change will take place if the dose be either too great, or too long continued, for the particular constitution.

Nothing has served more to prevent the beneficial employment of mercury, and other powerful medicines, in chronic cases, than the little attention which the influence of constitution in determining their effects has obtained. The observations I have had occasion to make on this subject, apply in no instance more strongly than to the use of such medicines.

Upon the whole, when the sedative effect appears in the employment of minute doses of mercury, one of the following plans is generally found to a certain extent successful. The first thing which should be tried, is still to lessen the dose. If even the smallest dose which is found to have any effect has still that of a sedative, when given frequently, the medicine must then either for a certain time be abandoned, or larger doses at longer intervals must be employed ; which sometimes succeed, after the effect of the more frequent minute doses, where they have previously failed. When the minute doses have, after being employed for some time, produced the sedative effect, the patient generally experiences great relief on abstaining from the use of the alterative ; and then only we can judge of the good it has done. In such cases, while he continues to improve under means which increase his strength and tend to mitigate the occasional symptoms, the alterative should not be resumed ; as soon, however, as symptoms of relapse show themselves, it is necessary again to have



recourse to it, and after this interval it is often borne better, at least for some time. If the sedative effect again shows itself, the only resources before again discontinuing the mercurial, are those just mentioned—lessening the dose or a trial of larger doses at longer intervals.

If by none of these plans the effect of the alterative can be so modified as to suit the constitution, and make the necessary impression on the disease, in the cases I am speaking of, whether long-continued functional disease, or such organic disease as mercury can influence, we can in general do little more than support the strength and afford temporary relief.

SUCH are the chief points to be attended to in the employment of minute and frequently-repeated doses of mercury in those chronic cases, in which they may be regarded as the appropriate remedy. The nature of the present treatise does not admit of my entering more particularly into these cases. They comprehend a large proportion of all the chronic diseases to which we are subject, and are characterised by the digestive organs having more or less share either in the causes which have produced, or those which prolong them.

I shall close this part of the subject, by cursorily relating a case exhibiting the effects of, and mode of regulating, the minute doses of mercury in a favourable constitution, where an unusual continuance of the treatment was required, but there were none of the difficulties above stated to contend with.

An officer, between thirty and forty years of age, returned from India in a state of great debility. His countenance was sallow, and at once informed the expe-

rienced eye that he laboured under organic disease. The liver was much enlarged and indurated ; he was subject to severe inflammatory attacks in it and the neighbouring parts, which greatly increased his debility, and frequently brought him into immediate danger ; and the whole of his state was such as is supposed rarely to admit of a perfect restoration to health. The temporary attacks were relieved by local blood-letting, and such means as allayed the pain and quickly restored a freer secretion of bile ; and in the intervals he was desired to take half a grain of blue pill and a grain of the extract of henbane, three times a-day, with such medicines as allayed the tendency to fever. The most nutritious diet, of easy digestion, which his state admitted of, was enjoined, and he was desired to be in the open air as much as he could without any degree of fatigue or risk of taking cold ; and, as his strength improved, to make walking his principal exercise. In a short time he experienced a sensible improvement in his health, the severity of the inflammatory attacks abated, and in the space of some months they ceased to return. He could now move about with more ease, although the enlargement of the liver was still considerable ; and, after being made acquainted with the circumstances necessary to be attended to, he was not prevented from going to the country, and to the Continent, to which his affairs called him.

His recovery gradually advancing, he repeatedly thought himself well enough, according to the directions I had given him, to permit the alterative to be discontinued ; but was constantly obliged to return to its use, in consequence of a return of the symptoms. I saw him from time to time, without finding any reason to change

his plan of treatment, assuring him that the time would come when the means of cure might be laid aside, without a return of the disease; and that it only required the remains of his disease, which were now slight, to be subdued, and the habit of health to be maintained by the medicines for a certain length of time, in order to render it permanent without their aid. It was now six or eight months from the commencement of the treatment, and hardly any enlargement of the liver could be perceived; and at each interval at which I saw him, the improvement, both of his looks and strength, was apparent. I still advised him, from time to time, to try how far the alterative could be laid aside; but to return to it as soon as he perceived the least threatening of a renewal of his symptoms.

At the end of more than two years from the time he had begun the employment of it, during which he was constantly recovering both his strength and healthy appearance, he found my prediction verified. He no longer required the use of medicine. All enlargement of the liver had disappeared, and he had in all respects regained both the appearance and habits of health. He returned to the service, but not to India; and although more than five years have now elapsed, he has experienced no symptom of his disease, and has lately gone abroad in a high official situation.

## SECT. II.

*On the Process by which Organic Disease is established.*

MUCH of what has been said will be illustrated by tracing the steps by which continued causes of irritation produce organic disease. We shall thus be led to the source of those sympathies to which I have so often had occasion to refer, and more clearly perceive the principles on which the action of mercury, and particularly of the minute doses of this medicine, depends.

It will not be difficult, I think, with the aid of various experiments relating to the functions both of the nervous and sanguiferous systems, compared with the well-known laws of the animal economy, to ascertain, up to the moment at which change of structure begins to take place, the process by which organic disease is established.

When we attempt to advance farther, our difficulties are greatly increased; and, were we capable of ascertaining the various changes which constitute the different forms of organic disease, we have so few means of influencing them that it is probable their treatment would be little improved by this knowledge.

In the great majority of cases, on the other hand, we possess means which powerfully influence the states which precede change of structure, and the better these states are understood, we shall be the better enabled to regulate the means which correct them.

It would extend this section to a greater size than the whole of the present treatise, were I to give the details of all the facts on which the positions stated in it rest.

I shall, therefore, as I proceed, refer the reader to passages in my former publications, where he will find these details ; for ever since I had sufficient knowledge of the subject to perceive the confusion which prevailed respecting the general laws of our frame, I have, as far as the more active duties of my profession admitted, been engaged in experimental investigations with a view to elucidate those laws ; and I refer to these investigations with the greater confidence, because many of the more important experiments have been repeated by the first physiologists, both of this country and the Continent, and have in no instance been found inaccurate.

On the powers of the nervous and muscular systems, and the relations these systems bear to each other, all the functions of life depend, and consequently all rational systems of medicine must be founded.

The knowledge of particular functions is necessarily of slow growth. It must be the result of many minute and laborious investigations ; and, although much has been done in this department by able physiologists, it must still be regarded as in its infancy. But however carefully individual functions may be studied, it is evidently impossible that they can be understood without a knowledge of the general laws to which they are all subjected. This, therefore, is the first object which demands our attention.

Thus it was that, after the revival of science, the attention of physiologists was in the first instance directed to determine the source and nature of the nervous and muscular powers, and the way in which they influence each other in their various functions ; and it is not without surprise that we see so little effected by the labours of so many celebrated inquirers.

At the time my investigations were begun, disputes prevailed respecting all the most important parts of the subject ; and the evidence on different sides seemed so nearly balanced that it was impossible to say on which it preponderated.

By one party, for example, it was maintained, that the power of the muscular fibre is derived from the nervous system, which by many was regarded as the only source of power in the living animal ; by another, that it depends on its own mechanism ; by one that it can be excited only through that system ; by another, that in the organs of involuntary motion, the nervous system is incapable of directly influencing it : and thus the very foundation on which all correct physiological views must rest was left in a state of uncertainty which extended itself to every department ; and although it was evident that the nervous system includes powers of the most dissimilar nature, and consequently more than one principle of action (for it was impossible to be blind to the different nature of the sensorial and nervous powers properly so called), no well-directed attempt had been made to draw the line of distinction between them, nor to ascertain with any precision the extent of their functions. And with respect to the nature of the powers of the living animal, there had been no serious attempt even to determine the fundamental question, how far they are peculiar to the living animal, or possessed in common with the inanimate world : yet it is evident that, unless all these points can be ascertained, no inquiry into the nature of particular functions can be successful, because the nature of all more or less depends on them.



WE know from ample experience that all derangement of function tends to derangement of structure ; the time required for this effect being different according to the state of the particular constitution, the nature of the part affected, and the nature and degree of the derangement produced in it.

The most frequent causes of derangement of function make their impression on the nerves of the part, and their effects may be divided into two stages. The first is merely a state of nervous irritation from causes acting on the part itself, or some part with which it sympathises. In neither instance, in this stage, is there any disease in the part to which we refer it. To whatever part the cause of irritation is applied, the immediate cause of suffering is in the central parts of the nervous system, and is only referred to the part to which we refer it, in consequence of experience having associated certain feelings with certain parts of our frame.

Now the general sensorium must either reside in one point which is capable of the various feelings associated with the different parts of our bodies, or it has a certain extent, and consists of various parts, each part being associated with its corresponding part in the general frame. We have sufficient grounds for believing that the latter is the case ; because, although the sensorium appears to be confined wholly or almost wholly, to the brain in man, and we might therefore suppose it confined to some one part of that organ, it has been proved experimentally that in some animals it extends both to the brain and spinal marrow, each possessing sensorial functions, and those in the most perfect state, after the total destruction of the other, and the functions of each being associated with different parts of the general

frame. These points admitted, a thousand phenomena evince that there can be no suffering in any one part of the sensorium without a tendency in all its other parts to partake of it.

Such are the observations which apply to the sensorial, and similar observations apply to the vital parts of the nervous system, properly so called ; for, as I have already had occasion to observe, the nervous system, according to the common acceptation of the term, consists of two parts, so different in the nature of their functions, that it is hardly going too far to regard them as distinct systems. By means of the sensorial system our intercourse with the external world is maintained : we are impressed by and capable of impressing it ; but this system, with the exception of respiration, has no direct influence on any of the functions immediately essential to life \*, which are maintained by other parts of the brain and spinal marrow † and a particular set of nerves which convey their influence.

The vital, like the sensorial parts of the nervous system, have a common centre ‡ ; and it has been amply

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\* My *Experimental Inquiry into the Laws of the Vital Functions*, Part II. chap. x. and xi., third edition. When I have occasion to refer to this Inquiry, it is always to the third edition. Also the last of my papers in the *Philosophical Transactions* for 1829.

† A paper, which the Royal Society did me the honour to publish in their *Transactions* for 1833. *On the relation which subsists between the nervous and muscular systems of the more perfect animals, and the nature of the influence by which it is maintained.*

‡ A paper on the nature of sympathy, which I lately had the honour to present to the Royal Medical and Surgical Society. It appears, from direct experiment, that in the nervous system the active parts of the vital, like those of the sensorial system, are confined to the brain and

proved, both by the effects of accidents and other diseases in man, and by experiments instituted for the purpose in other animals, that the organs on which all the powers of the vital parts of the nervous system depend, extend to both the brain and spinal marrow. But, as appears from various experiments, there is this essential difference in the relation which the sensorial and vital nerves bear to the brain and spinal marrow, while each of the former is associated with only one particular part of those organs, each of the latter is associated with every part of them, from the upper surfaces of the brain and cerebellum to the lowest part of the spinal marrow \*.

It is evident from the phenomena of the animal economy, compared with the experiments here referred to, that each part of our frame receives the influence of both the sensorial and vital parts of the brain and spinal marrow, each possessing both the sensorial and nervous power properly so called. Nor is it difficult to account for this, the sensorial and vital nerves freely communicating. It is a necessary inference from the whole of these facts, that it is by the sensorial, not vital, nerves, that different parts of the general frame are associated with different parts of the brain and spinal marrow ; but such is the sympathy between these sys-

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spinal marrow ; so that the change effected by causes of irritation, to whatever part applied, influences the vital as well as sensorial functions of the part only through those organs. See the paper in the Philosophical Transactions last referred to.

\* *Experimental Inquiry into the Laws of the Vital Functions*, Part II. chap. i. and ii., and the papers which the Royal Society did me the honour to publish in the Philosophical Transactions for 1815 ; also my papers in the same Transactions for 1829, 1831, and 1833.

tems, that the affection of the one, in any part of the frame, is immediately felt by the other. Thus causes wholly mental may excite disease not only of the brain itself, but of all other parts, of which the vital nerves partake as freely as the sensorial nerves partake of disease excited through the former.

By mental impressions, for example, the action of the heart may be influenced in every possible way. It may be rendered more or less powerful, and more or less irregular, and both in every possible degree; and where the cause is extreme, its powers may be instantly and finally destroyed; and where less violent, but of longer continuance, its assimilating functions may be so influenced as wholly to derange its structure: yet we know, from direct experiment, that the vital parts of the brain and spinal marrow, from which the heart receives its nerves, are capable of their functions after the sensorial system has ceased to exist\*; and similar observations apply to the blood-vessels, even to their minutest ramifications†. On the other hand, it is notorious that it is impossible for the secreting and other assimilating functions of any organ, all of which immediately depend on the vital parts of the brain and spinal marrow, to be greatly disordered without the central parts of the sensorial system more or less suffering along with them.

It often depends on the tendencies of the particular constitution, whether the same cause of irritation most

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\* *Experimental Inquiry into the Laws of the Vital Functions*, Part II. chap. iii. and ix.; and my papers in the *Philosophical Transactions* for 1815, 1827, and 1829.

† *Ibid.*; and my paper *On the Nature and Source of the Powers of Circulation*, in the *Philosophical Transactions* for 1831.

affects the sensorial or vital parts of the nervous system; and we have seen how much the nature and tendencies of disease depend on the degree to which its effects are directed to the one or the other \*.

Now, although an offending cause making its impression on any part of the body must, in the first instance, influence those parts of the brain and spinal marrow, with which it is associated; yet it is more or less felt by all other parts of these organs, because both systems are impressed, all parts partaking of both; and each, being a whole, cannot be impressed in any one part without all its other parts feeling the impression.

But in almost all instances, although the impression of every offending cause, on whatever part of the general frame it may be made, is more or less felt by every other, we find that it is most felt in certain parts, and consequently must be most felt in the central parts of the nervous system which correspond to those parts.

The parts which suffer most are determined by different causes. The cause of most general operation is vicinity to the part impressed by the offending cause. All neighbouring parts sympathise, but this law admits of modifications by causes of less general operation.

One of the most powerful of those is peculiarity of constitution, in consequence of which certain sympathies are more powerful than usual; but the most frequent is debility, arising either from some original fault in the part sympathetically affected, or from former causes of suffering. The weakest part feels most the cause which affects the whole; and frequent suffering renders it so

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\* Pages 59 et seq.

liable to suffer again, that every impression, whether general or local, is particularly felt by it.

It is not difficult to prove that such are the laws by which the progress of disease is regulated \*. When any part of the body is exposed to causes of irritation chiefly affecting the nerves, however slight, they are instantly felt by the central parts of the nervous system, corresponding to the part assailed; and in proportion as the parts of the brain and spinal marrow on which the functions of the part in question depend—for we have seen that in both systems the active parts are confined to these organs—are thus impeded in their functions, the nervous power requisite for those of the part impressed by the offending cause necessarily fails; and, in consequence of this failure, its extreme nerves, on the co-operation of which with its extreme vessels all its assimilating functions depend, begin to be incapable of their part in these functions.

To a certain point, the vessels accommodate themselves to the change; for the resources against the establishment of disease in every part of the system are powerful. The functions of the part are more or less disordered, for one of the powers on which they depend is more or less enfeebled; but the vessels still maintain the healthy diameter, and a free motion of the blood, and for some time there is no evidence of the debilitated state of the nerves having spread to them. This state of the part must be regarded as the first stage of that which leads to organic disease; because, if it continue for a certain length of time, it will be followed by

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\* My treatise *On the Preservation of Health, and particularly the Prevention of Organic Diseases*.



those changes which, in most parts of our frame, necessarily terminate in disordered structure.

However slight the failure of nervous power, the functions of the vessels are more or less impeded by it; their functions are performed with greater difficulty, and their powers necessarily, sooner or later, and in a greater or less degree, both from this cause and the disordered state of the central parts of the nervous system—which, although the power of the vessels is independent of this system, are, we have seen, capable of directly influencing them \*,—begin to fail. As soon as the capillary vessels partake of the debility, they begin to be morbidly distended by the usual force of the circulation. The part assumes a redder colour; and if inspected with the assistance of the microscope, its capillary vessels are found to be enlarged, and the blood in them, in the same proportion, to move more slowly than in the healthy state †.

The part is now in a state of inflammation, which proves either acute or chronic, according to the nature of the offending cause and the nature and state of the part affected. It appears from experiments made with the assistance of the microscope, and detailed in the introduction to the second part of my *Treatise on Febrile Diseases*, and which have been repeated with the same results by Dr. Hastings ‡, that inflammation consists in a debilitated and distended state of the capillary ves-

\* *Experimental Inquiry into the Laws of the Vital Functions*, Part II. chap. i. and ii.; and my papers in the *Philosophical Transactions* for 1815, 1829, 1831, and 1833.

† *Experimental Inquiry*, Part III. chap. ii., and the Introduction to the Second Part of my *Treatise on Febrile Diseases*.

‡ His *Treatise on Bronchial Inflammation*, &c.

sels, by which the larger vessels of the part, and, if the inflammation be of great extent or seated in a vital organ, those of the whole system, as well as the heart itself, are, in consequence of the sympathy of the parts, excited to increased action, apparently for the purpose of supporting the motion of the blood in the debilitated vessels : which, in acute cases, goes so far as to produce all the symptoms of fever, but in chronic cases only shows itself by some tightness of pulse, and more or less occasional and often only partial increase of temperature, in consequence of the vessels embracing the blood more forcibly than in health.

The part on which the cause of irritation makes its impression, is now in a state which may be regarded as the second and last stage of that which precedes change of structure. Both the vessels and nerves, on the co-operation of which the healthy structure depends, are debilitated, and the next step is a deviation from that structure.

Such is the succession of events when the offending cause tends directly to debilitate the nerves alone. It may, however, act directly on the vessels alone, which only happens in cases of rare occurrence, or on both, the last being the process most frequent in acute, the first in chronic disease ; and here, as in all other instances, whether the offending cause acts on the nerves or vessels, or both, instead of directly debilitating, it may in the first instance act as a stimulant, and the first effect on both be that of increased excitement, the debility being only consequent on this effect.

The whole of both processes, as far as relates to the vessels, that is, whether the offending cause acts as a stimulant or direct sedative, may be distinctly seen in

the transparent parts of living animals, as I have often witnessed, with the aid of a microscope of moderate power \*. While the offending cause acts as a stimulant, its effects, as might be foreseen, are found to be those of lessening the capacity of the capillary vessels, and in the same proportion increasing the velocity of the blood in them ; the inflammatory state only supervening in proportion as these vessels, exhausted by the increased action, begin to lose their power.

In the one or other of these ways, a state of debility, both of the extreme nerves and capillary vessels of the part, is always at length induced by continued causes of irritation †. If the cause be such as equally affects the nerves and vessels, the power of both fails together ; if chiefly the nerves, their power is impaired by the process just described, and their debility never fails at length to be communicated to the vessels with which they are associated in all their functions, and which are equally with the nerves themselves, although in a different way, under the influence of the brain and spinal marrow ‡.

Thus inflammation of the part, of an acute or chronic nature, according to circumstances, is established ; and it is evident, from what has been said, that the tendency to disease of structure, *ceteris paribus*, must always be proportioned to the degree in which this takes place ; that is, in proportion to the derangement of those organs, namely, the extreme nerves and vessels, on the

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\* Introduction to the Second Part of my *Treatise on Febrile Diseases and Experimental Inquiry*, Part III. chap. ii.

† Page 53 et seq.

‡ *Experimental Inquiry*, Part ii. chap. i. and ii. ; and my papers in the Philosophical Transactions for 1815, 1829, and 1833.

healthy co-operation of which the due structure of the part depends. Hence in chronic cases the degree of tightness of pulse is always found one of the best measures of the tendency to organic disease, and hence, in its prevention, the great importance of anti-inflammatory measures, as far as the state of the strength will admit of them; and the great injury done by every cause which tends to increase the inflammatory tendency beyond what is essential to the maintenance of the general strength: for the greater the debility the more intractable all diseases become. The art of medicine is directed to second the efforts of nature; and in proportion as her efforts fail, ours necessarily become ineffectual.

Whether loss of power in the nerves precedes or accompanies that of the vessels, the immediate cause of the former necessarily exists in the central parts of the nervous system; because, as I have just had occasion to point out, on them alone depends all the power of the nerves, whether sensitive or vital\*. The immediate cause of loss of power in the vessels exists in the vessels themselves, because there is no common centre of muscular power. Hence it is that it is only in proportion as the latter exists, that there is any actual disease, and consequently any immediate tendency to derangement of structure in the part†.

When the whole of the facts which have been stated are considered, we shall, on one hand, find no difficulty

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\* My paper *On the Relation of the Nervous and Muscular Systems*, in the Philosophical Transactions for 1833.

† My paper *On the Nature and Source of the Powers of Circulation*, in the Philosophical Transactions for 1831.

in tracing the steps by which sympathetic diseases are established ; and on the other, those by which change of structure takes place in the part either originally or sympathetically impressed by the offending cause.

In the seat of that cause its operation may be such as equally affects both the nerves and vessels. In the part sympathetically affected the nerves must always be the first which suffer, the vessels suffering in consequence of failure of power in them, and more directly in consequence of the disordered state of the central parts of the nervous system with which its nerves are associated ; for it has been proved by direct experiments, which have been too frequently repeated to admit of fallacy, that the brain and spinal marrow are capable of directly influencing the vessels to their minutest ramifications in every part of the system, and in every way of which the vessels are capable, increasing or impairing, and, when the cause is extreme, wholly and finally destroying their action \*.

As the state of the part impressed by the offending cause immediately influences the central part of the nervous system with which it is associated, so any other of the central parts of that system, affected by sympathy with the part thus influenced, immediately influences the part of the general frame associated with it, and thus sympathetic disease is established in parts however distant from that first impressed : this sympathetic disease affecting the vessels, and in all respects running the same course as that excited by the immediate impression of the offending cause.

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\* *Experimental Inquiry*, Part ii. chap. i. and ii. ; and my papers in the *Philosophical Transactions* for 1815.

From the circumstance alone of the disease running the same course, whether it be original or sympathetic, we might be led to infer, as follows from what has been said, that whether the offending cause make its impression on the nerves of the part to which it is applied, or by sympathy on those of a distant part, the state of the part affected is the same: the only difference in the two cases being, that in the former, the affection induced on the corresponding central part of the nervous system succeeds, in the latter precedes, the impression made on the nerves of the part. In both, as the failure of nervous power in the part depends on the impaired functions of the corresponding part of the brain and spinal marrow, and as in both all that follows depends on this failure, the course the disease runs is necessarily the same, whether the offending cause operates by its immediate or sympathetic action. Thus, for example, we found that the course of disease in the lungs, if it be allowed to establish itself, is precisely the same whether it has arisen from a cause of irritation acting directly on them, on the brain and spinal marrow themselves, or through the intervention of the liver.

It appears from all that has been said, that organic disease may arise from any cause debilitating the extreme nerves and vessels, or either of them; and whether it acts on the part itself, or on those parts of the brain and spinal marrow with which it is associated, and that either immediately or in consequence of an impression made on some other part of the general frame: and that the state of the part induced in any of these ways, and which always precedes change of structure, and must therefore be regarded as its cause, is necessarily more or less



an inflammatory state ; that is, the extreme vessels having been debilitated, have suffered more or less morbid distension from the usual force of circulation, in consequence of which the larger vessels of the part or the whole organs of circulation, according to the extent or importance of the part affected are, by the sympathies of our frame, more or less excited to increased action ; and, as might, from what has been said, have been foreseen, the tendency to change of structure is always, the part affected being the same, found to be proportioned to the degree and obstinacy of this inflammatory state. These observations apply to all such cases as those we are considering, that is, all cases arising simply from causes of irritation, and perhaps to all cases whatever, however specific the cause of the disease ; but with the nature of the latter cases we are by no means so well acquainted. It will tend to illustrate what is here said, that even the natural and healthy changes of structure which certain parts of some animals undergo, are preceded by distension of the vessels, the difference being that the morbid distension is a state of debility, which we have no reason to believe that the other is, although they both tend to change of structure.

The way in which the inflammatory state operates in effecting the various changes which constitute the different species of organic disease, as I have already had occasion to observe, must be the subject of future investigations. In the meantime the information of most consequence to us is the nature of the states which cause change of structure, and the best means of counteracting them ; because, after it has taken place, if we except certain organic affections of the liver and a few

other parts over which the great powers of mercury give us some controul, it is seldom in our power essentially to influence its progress.

There is one instance, however, in which the structure of the part suffers, and in which the change is simple, because it consists in the mere destruction of the healthy organisation, not in the establishment of any new organisation of the parts affected, and is evidently but the continuance and consequent increase of the change which has been going on from the commencement of the disease.

We have seen that all the changes which precede organic disease indicate loss of power in the vital functions of the part ; either its vessels, or nerves, or both are debilitated. If this failure of power proceeds without the interference of any cause to disturb its course, it is evident that it must terminate simply in a total loss of those functions. The part must wholly lose its vitality, and become subject to the laws of inanimate matter. Such is the termination in gangrene ; a change, for evident reasons, which more peculiarly belongs to active, as new organisation, if we except suppuration, to chronic, inflammation, because the latter change generally requires a considerable time for its accomplishment.

As the due structure of every part depends on the healthy co-operation of its extreme nerves and vessels, whatever debilitates them must endanger it ; and if to a certain degree or for a certain length of time, destroy it. Thus it is that mercurial medicines are more effectual than any other in obviating the tendency to organic disease, no other so powerfully influencing the extreme parts of the nerves and sanguiferous systems ; and hence, we have seen, a chief advantage of the minute

doses, of such doses as produce only the stimulant effect, and consequently tend to excite to their due functions both the nerves and vessels, by the weakened action of which the structure is endangered ; an evil which must necessarily be increased if the mercurial be given in such doses, or continued for such a length of time, as to produce its sedative effects, by which we have seen the power both of the nerves and vessels is impaired.

To what degree a debilitated state of the nerves and capillary vessels of a part may exist, and how long it may continue, without affecting its structure, depends much on the nature of the part, some organs bearing causes of irritation better than others : the stomach, for example, than the lungs. The former will often bear the operation of such causes for the greater part of life, without derangement of structure ; while that of the latter may, even in chronic cases, in a few weeks undergo such a change as sets at defiance all our means of cure.

Of all organs the lungs are the most prone to change of structure. Hence it is, that when the cause of irritation is of general operation, they often suffer most ; and a cause of derangement, which in its early stages, appears in no degree to be determined to them, often terminates in their disorganisation.

Thus chronic disease of the brain or spinal marrow, whether original or sympathetic, often terminates in pulmonary consumption, the lungs being the part which feel most the cause which affects the whole. Such is one of the species of sympathetic pulmonary consumption above referred to, which it is often impossible effectually to relieve, even in its early stages because we often have no means of effectually relieving

the disease on which it depends. But whatever be the other organs which in such cases chiefly suffer by sympathy with the brain and spinal marrow, according to my experience, the function of the liver, as we might expect from its intimate sympathy with the brain and through it, with the spinal marrow, always suffers at the same time; and from this cause, and its greater or less sympathy with all the other vital organs, the affection of the liver,—if disease is not actually established in it, in which case, we have seen, it often acts on the principle of an issue with respect to the other parts of the disease,—tends to aggravate the original disease on the one hand, and on the other the sympathetic affection, whatever be its seat.

In proportion as the liver is disordered, and its disorder influences the seat either of the original or chief sympathetic affection, the minute mercurial doses assist the plan of cure in the way which has just been described. Where they produce no degree of the sedative effect, by their general stimulant and gentle operation on the extreme parts of both the nervous and sanguiferous systems, they necessarily tend to invigorate, and therefore to remove, the cause of derangement in both.

Mere nervous affections never prove fatal, except when both sudden and extreme. Joy and grief have been known instantly to destroy life.

Here the cause of death is simply the extinction of the vital power of those parts of the brain and spinal marrow on which the functions of life depend—and, through them, of the organs of those functions; and no change of structure is to be perceived after death. But when the cause of the nervous derangement is less violent, and consequently its operation less rapid, it always

in the first instance sensibly influences the state of the vessels, and through them the structure of the part affected; the derangement of the structure being apparent after death.

Whatever be the suffering, if the cause be not such as to affect the healthy state of the vessels, its removal leaves the part debilitated, but not diseased. We can always judge of the state of the vessels by that of the pulse. As soon as the capillaries of any of the vital organs begin to lose their power, and consequently to suffer morbid distension, of however chronic a nature the disease may be, the pulse in the same proportion begins to be what we call hard. Instead of the soft impression made on the finger by the healthy pulse, it begins to impress on it more or less of a wiry feeling, especially if it be felt with a slight degree of pressure; the vessels throughout the system beginning to embrace the blood more forcibly than in health, for the purpose of supporting the circulation in those debilitated by the disease. If the distension of the capillaries, and the consequent tightened state of the circulation, be considerable, it constitutes active inflammation, and the structure of the part may be destroyed in a few hours. In proportion as these changes are less considerable, and more slowly effected, the disease assumes a more chronic form; but, however slow in their progress, their tendency, as is evident from what has been said, is to destroy the structure of the part, although in the latter case, as might be expected, the change they induce is often of a different nature from that effected when the progress is more rapid.

I might here refer to a great variety of diseases, terminating in disordered structure, the phenomena of

which illustrate these observations, were it not that it would too much extend this section. I shall simply mention two, which, in consequence of their appearing so little formidable in their early stages, have received less attention from practical writers than their importance and frequency demand.

I beg to refer the reader to my *Treatise On the Preservation of Health, and particularly the Prevention of Organic Diseases*, for an account of a disease of the brain, to which I have already had occasion to refer ; also for a disease of the lungs, which is apt to supervene at advanced periods of life, in which, after it is decidedly established, I have found no plan effectual, except in combination with the minute and frequently repeated mercurial doses.

SOME diseases, even of a chronic nature, seem to prove fatal from mere loss of function in the extreme parts of the nervous and sanguiferous systems without time being given for much change of structure to take place. Thus, for example, we sometimes find in people past middle age, and in other respects in their usual health, the gradual prevalence of a heavy drowsiness. When they are at rest, especially after meals, they are irresistibly inclined to sleep : and by degrees they find, even at other times, that they do not possess their usual vigour either of mind or body. If these warnings are neglected, the drowsiness occasionally approaches to insensibility. The patient is roused with difficulty, and disturbed and confused for some time after he is roused. Such a state is not unusually the prelude to a fit of sanguineous apoplexy ; but it generally proves of the more favourable kind, that is, it is the effect of over-



distension, not rupture, of the vessels of the brain, and is generally removed by proper evacnants. If, however, it returns the vessels which have suffered distension are left in a debilitated state, and after a very few attacks, they no longer obey our means of cure. We may still abstract blood from the head, and attempt to relieve its vessels by free discharges from the bowels; but their morbid distension continues, they are incapable of recovering their healthy diameter, and thus expelling the blood which distends them; and then the disease is as certainly fatal as if the rupture of a vessel had taken place. I never knew a case of this kind in which the function of the liver was not disordered, and in which the symptoms could be effectually relieved without restoring it. Yet the patient, even at the time he is most alive to his disease, makes no complaint of the region of this organ; but if the physician lay his hand on it, he will always find it morbidly distended, and often tender on pressure; and he will also find it impossible effectually to relieve the disease without removing this distension and tenderness.

In other instances we find an oppressed state of the breathing gradually creeping on, most felt during exercise, after meals, and when the patient has been for some time in a recumbent posture. His colour at length becomes sallow, his legs swollen, and his kidneys inactive. His lungs are then in an œdematous state, and the same fulness, and often tenderness in the region of the liver, will be perceived on examination, although no complaint of the patient will direct the physician's attention to this region; but the disease cannot be effectually relieved without removing these symptoms. This case is not of the fatal nature of Hydrothorax,

properly so called, where the collection of water is in the folds of the pleura—a disease that, in its earlier stages, readily admits of relief, but seldom, in any stage, of cure. In the case before us, any effusion which has taken place is into the cellular texture of the lungs, and will be finally re-absorbed if the general vigour of the system can be restored.

Many similar cases might be enumerated, in which affections of vital organs are complicated with chronic disease of the liver. To all such cases, which can hardly ever be effectually relieved without the aid of mercury, the minute doses are peculiarly adapted. I have found the usual means essentially aided by them, and in many they have been successful with this aid where, without it, it was evident, from our experience of such cases\*, they would have failed.

\* A few months ago, having obtained the consent of the President and Council of the Royal Society, I republished, from the Philosophical Transactions, in a Treatise entitled *An Inquiry into the Nature of Sleep and Death*, all the papers referred to in this section, the contents of which have not already appeared in my *Inquiry into the Laws of the Vital Functions*.

## SECTION III.

*Of the Employment of Minute and frequently repeated Doses of Mercury in Acute Diseases.*

I AM now to lay before the reader such observations as my experience has afforded respecting the effects of minute and frequently repeated doses of mercury in acute cases. It is evident, from what has been said, that they cannot supply the place of the more active doses of this medicine, which are often employed with such advantage, particularly in the early stages of those diseases, with a view to excite the torpid liver, relieve its loaded vessels, and cause a general determination of the fluids downwards, where, from the excited state of the circulation, and the capillary vessels of the vital organs, in consequence of their more powerful sympathies, being more apt to be debilitated by the offending cause, on whatever part it operates, than those of more external parts, there is too great a determination to internal parts, and, from the nature of the circulation in the head, particularly to the brain. While these and other means of great and immediate effects are in any considerable degree necessary, the minute doses have generally no sensible operation, and therefore no place. But in a large proportion of acute diseases, after they are to a certain degree mitigated, the symptoms are prolonged by the obstinacy of local affections, which have either produced, or been produced by, the state of general excitement. The liver, from its extensive sympathies, often shares in the original cause; and still more frequently the state of this organ, induced by the disease of other parts, tends to prolong or renew it, and

the patient thus falls into a state of less acute but obstinate suffering.

The cases most apt to degenerate into such a state, are those of protracted fever and affections of the liver and the organs which most sympathise with it—particularly the brain and lungs. Every physician must have met with cases of fever which neither subsided as usual, nor were followed, as happens in favourable cases, by a good appetite and a more or less rapid recovery of strength. Either the febrile symptoms continue to recur, or the patient remains languid and dispirited, and what are called the remains of the disease hang about him. In by far the majority of such cases, it will be found that more or less permanent functional disorder of the liver has been established; and although, from the chronic nature of this affection, it has not prevented the subsiding of the more urgent symptoms, it supports a constant tendency to their renewal; and where it is not sufficient to produce this effect, it frequently prevents the recovery of the appetite, and always of the strength and spirits.

The state of the liver can only with certainty be ascertained by an examination of the regions of this organ, and of the duodenum, where some tenderness or fulness will be discovered, if the cause which impedes the recovery exist in the liver, which, in consequence of the more extensive vital sympathies of this organ, it will be found to do in at least nineteen such cases out of twenty.

Every one will agree that, under such circumstances, all vigorous measures of a debilitating nature are out of the question; but it is not at all uncommon to see such cases aggravated by the attempt of the practitioner

to restore the strength by powerful tonics, by which both the tendency to a recurrence of the fever and the oppression and restlessness are increased; and I have seen many such instances, in which the patient, guided by the effects of these means, has refused to pursue them. In the most favourable cases of this kind, they tend only to support the patient under his disease, not to relieve it; and, if their effects on the liver be not counteracted by the efforts of the constitution itself, never fail eventually to increase the mischief. The only effectual means are those which restore this organ, which is only to be here attempted by such as suit the debilitated state of the patient.

In many instances, a few grains of the blue pill, taken every second night, and gently carried off by the bowels on the succeeding morning, combined with means which prevent the return of the febrile symptoms, and such stimulants as the patient can bear without any tendency of this kind, or any increase of the restlessness and oppression are sufficient. In the more obstinate cases, such means fail; and then I know of none which will succeed except the combination of the minute and frequently repeated, with the occasional larger mercurial doses, and the other means just mentioned, regulated on the principles I have explained. The existence of such a case as that I am describing is, I believe, generally the effect of the state of the liver having been overlooked in the course of the fever; and its frequency points out in a striking manner the necessity of attending to the state of this organ in all diseases of prolonged excitement—a necessity still more strikingly exemplified by what I am about to say of the cases in which the excitement is supported by a local cause.

As the blood is returned from the brain by canals which cannot partake of the generally increased excitement of the sanguiferous system, such excitement is necessarily accompanied by a tendency to an accumulation of blood in the vessels of this organ, which within certain limits, for the time increasing its powers, appears to be a provision of nature, for bestowing on us greater than usual nervous energy at the times it is most called for, as under the impression of the exciting passions, or in running, wrestling, &c. Hence in all diseases of increased excitement more or less tendency to accumulation of blood in the head is a constant attendant. To this we must refer the pain, and many other affections of the head, which are so apt to attend fever. 22

The tendency to these subsides, of course, as the excitement of the sanguiferous system abates, unless the brain or its vessels have sustained some more permanent injury during the period of its excitement. It seems frequently to happen, however, especially when the general excitement of the sanguiferous system is great and long-continued, that even where the due action of the brain itself is restored, the organs, which most sympathise with it, and particularly such as happen to be most liable to disease, suffer more permanent derangement of function. It seems to be from this cause, as well as from their vessels partaking of the state of general excitement, that various local derangements arise in fever.

No organ is so liable to suffer in this way as the liver, and in some climates we have seen this liability so great that its affections become the leading feature in almost all diseases; and even in such climates as our own, functional derangement of this organ is the most fre-



quent of all the local affections which supervene in fever. Such appears to be the origin of the cases I have just referred to, the hepatic affection remaining after the fever has subsided.

It is when it becomes evident in the course of the fever—and when it does so, it always aggravates and prolongs it—and has resisted occasional active doses of mercury, that I have found the minute doses of this medicine, in conjunction with the usual means, so beneficial. The amelioration of the symptoms, and a more favourable course of the whole disease, may, under such circumstances, be with confidence expected from them, particularly when combined with local measures in the neighbourhood of the liver ; and I have never seen an instance in which they in any degree tended to increase the febrile symptoms. By their means, with or without the continued aid of occasional more active mercurial doses, according to circumstances, the hepatic affection may always be controlled and brought to terminate with the fever ; so that such cases become as manageable, and as little liable to leave remains behind them, as when no hepatic affection has attended.

In acute cases, I generally give the mercurial every six instead of eight hours. In these, especially where the excitement is still considerable, it rarely shows any tendency to affect the mouth, and, what is remarkable, very rarely to produce any degree of the sedative effect to which, in consequence of the more powerful impression of the disease, the constitution is for the time very little liable. It very seldom, indeed, produces any sensible effect, but that of lessening the fulness and tenderness of the region of the liver, and a general and gradual mitigation of the symptoms.

Towards the decline of the fever, where such an affection of the liver has supervened, the fever often seems to be supported by this cause alone; and even in cases where it has proved most obstinate, will immediately begin to abate on the system being brought gently under the influence of the alterative.

THERE is another class of acute diseases, in which the minute mercurial doses constitute an important part of the treatment;—I allude to acute inflammation of the liver itself, or of those organs which most sympathise with it—particularly the brain and lungs.

Their benefit in acute *hepatitis* is not confined to the more advanced stages; they are of essential use as soon as the canal is effectually cleared by more powerful mercurials, combined with proper purgatives. When larger doses are given with any other view than the evacuations they occasion, they tend to increase the inflammatory symptoms; yet in this case, the constitutional as well as the local effects of the mercurial are required, and by the minute doses it is obtained, as far as I have observed, without any tendency of this kind, even in the most inflammatory cases.

When the affection of the liver is secondary, the local operation of the larger doses is often sufficient to restore its function. In such cases, it is only when it degenerates more or less into a chronic state, that, in general, the constitutional effect of the medicine is required; but in the case before us, we want all the aids which the great influence of mercury on the part here primarily effected is capable of affording; and this is the more necessary, because here, as well as in the secondary affections, the disease is apt to degenerate into a chronic

form, and become more obstinate in proportion as it does so; the speedy relief of which will depend on the degree in which the system is prepared to meet it. We have seen in the case of the officer above detailed, that in proportion as the system was brought under the influence of the minute doses, the attacks of *hepatitis* which threatened the patient's life declined, and at length were wholly prevented.

In inflammation of the brain, the function of the liver is always more or less affected, and this organ not unfrequently partakes of the inflammation; and as its affection has its cause in the powerful sympathy which exists between these organs, it cannot fail to influence the original disease. Thus it is, that, in inflammation of the brain, the state of the liver always demands attention, and is often the means of supporting and renewing the inflammatory affection of the former organ. When, as not unfrequently happens, habitual derangement of function in the liver has been originally the means of determining the inflammation to the brain, the treatment of the hepatic affection, after the more severe inflammatory symptoms are relieved by proper evacuations, constitutes the most important part of the means of cure.

We have a familiar instance of the effects on the brain of continued irritation of the digestive organs in the internal water of the head in children, which, in nineteen cases in twenty—I may say, indeed, in all which are not the consequence of mechanical injury of the brain—arises from this cause, and which, without the aid of mercury, may, even in its earlier stages, be regarded as very nearly an incurable disease, so unsuccessful are all our other means without it. Now the

same laws obtain, though in a less striking manner, when in other instances the brain suffers from the state of the liver in febrile as well as other diseases.

There is a peculiarity in the effects of mercury in children. In them, calomel is generally its best preparation, and the frequent repetition of minute doses has much less sanative effect in them than in adults. The same principle, however, holds in the treatment of their diseases. Except where they require the immediate and powerful effects of the medicine, comparatively small doses at comparatively short intervals, is the most effectual mode of employing it. I have found half a grain of calomel, given at the interval of eight or twelve hours in the more urgent, and twenty-four or forty-eight hours in the less urgent cases, combined with more or less rhubarb, or some other cathartic, according to the state of the bowels, and occasional larger doses, the best alterative in them; for here it should generally be made to act more or less as a purgative. Its local operation seems to be that which best suits the constitution of children.

Advantage is rarely obtained, but often great distress and even danger, from the mercury affecting the mouth, particularly in very young children, which every practitioner knows is, fortunately, very little apt to happen. Whether given in large or small doses, it should be so given as to act as a purgative only, except in a very few acute cases where life is immediately threatened, and the immediate and most powerful effect of the medicine is required; and even here, the bowels must be kept in the most open state, which the large doses, sometimes necessary even at short intervals, seldom fail to do. This practice, which is, I believe, often carried farther

than is either necessary or proper, is in general borne far better than we should, *à priori*, expect. The free secretion of mucus from the bowels of children, seems both to defend them against the irritation of the calomel, and to prevent its absorption.

In the less acute cases, it is surprising from what states infants may be restored by the alterative use of calomel, given in the way just mentioned. When the skin has become yellow and shrivelled, and hung loosely round the emaciated limbs, in which there remained scarce a trace of muscle, the wrinkled countenance assuming an expression of extreme old age—a remarkable feature in the worst stage of certain chronic diseases of infants—while the distended and in many parts indurated abdomen has appeared to have drawn to itself almost all the remaining substance of the enfeebled frame, the change effected by such means in a favourable habit—for we cannot always expect such a result—has surprised all who witnessed it. As the abdomen decreased and became of a natural softness, the limbs have become plump, and the countenance of a healthy colour and natural expression.

From all that has been said of the influence of the brain in the vital functions, and consequently the influence of their organs on it—for the sympathy is always more or less mutual—and from what was observed above respecting its chronic inflammatory affections, the reader will perceive how essential the employment of mercury, given in the way adapted to the state of the case, and particularly that of the attending hepatic affection, is in all long-continued diseases of this organ. Some affection of the liver always attends them, and sometimes, even where the state of this organ has had no share in



producing that of the brain, but had been its consequence, the latter is both supported and aggravated by it ; so that the cure of the sympathetic not only becomes essential to that of the original disease, but often the most important part of the treatment.

From the great extent of the sympathies of the liver, many of the foregoing observations apply to a great variety of other cases. It would swell the present treatise to too great a size, were I to attempt even cursorily to consider all ; I shall therefore close it with a few, and but a few, observations on affections of the heart and lungs.

Next to the brain, there is no organ which so powerfully sympathises with the liver as the lungs. It is now above five-and-twenty years since I first, in my *Treatise on Febrile Diseases*, endeavoured to distinguish that species of pulmonary consumption which arises from affections of the liver, and to point out its appropriate treatment. A few years afterwards, I presented to the Medical and Surgical Society of London, a treatise on this subject, which appeared in their Transactions, and which above ten years ago was republished in my *Treatise on Indigestion* ; and in a *Treatise on Organic Diseases*, published in 1830, I have entered into the subject more generally, and pointed out other affections of the lungs which often have the same origin.

Although it is much less common for disease to spread from the lungs to the liver than *vice versa*, yet this not unfrequently happens, and the affection of the liver then re-acting on the lungs, for actual disease of the liver is hardly ever established in such cases, never fails to add to the obstinacy of the original affection, and to increase its tendency to return. I have already had occasion to



refer to some acute affections of the lungs, illustrating this observation. Thus, as we have seen in other instances, the treatment of the sympathetic affection, in protracted cases, sometimes becomes the most essential, recovery being prevented by it alone ; for, from the various causes which have been mentioned, wherever affections of the liver supervene, they are apt to become the most obstinate part of the disease. On this part of the subject I must also decline further to enter, the present observations having already extended beyond the limits I had assigned to them ; I shall therefore, only remark, that it affords many proofs illustrating what has been said of the state of the liver in diseases which, at first view, appear to have little relation to it. The liver being, on the one hand, an organ of little sensibility, and on the other of the most extensive vital sympathies, the reader will easily perceive how readily, in complicated cases, it may essentially influence the disease, and yet escape the attention of a practitioner who is not sufficiently aware of its peculiarities. I need hardly add, that all cases in which it is concerned, whether primarily or secondarily, the medicine which so powerfully controuls it forms a more or less essential part of the treatment, not only as far as relates to the speedy or protracted recovery, but often, to the favourable or fatal termination ; and as far as the cure is to be effected by the habitual use of mercury, I feel no hesitation in saying that the minute and frequently repeated doses will always be found not only the safest, but the most effectual mode of employing it.

The sympathy of the heart with the stomach is greater than with the liver, as many of the phenomena of disease evince ; but such is the immediate sympathy

of the stomach and liver, that in many cases, the heart is almost as much influenced by the state of the latter as if its sympathy with this organ were more direct ; and as after the disease has spread to the liver we have no means of counteracting habitual debility of the stomach without restoring the function of the liver, the treatment is pretty nearly the same in protracted functional disease of the heart, whether acute or chronic, depending on the state of the digestive organs, as if it more immediately depended on the state of the liver alone.

I may here remark, although the observations I am about to make apply rather to chronic than acute cases, that it is of the first importance in the treatment of affections of the heart to inquire how far its organic diseases can be traced to long-continued functional derangement, and what share affections of the digestive organs have in supporting that derangement. These questions I have considered in a treatise on the prevention of organic diseases above mentioned, to which I must refer the reader. Much of what is there said is strikingly illustrated by the case of Mr. Hobson, of Mary-le-bone Street, a well-known and highly respected member of our profession, related by himself in the number of the Medical Gazette for the 22nd of October, 1831. This case is equally illustrative of the power of sympathy in determining the phenomena of disease, and that of the minute and frequently repeated doses of mercury in controlling them.

Mr. Hobson had for thirty-four years laboured under symptoms of diseased heart, to which all the powers of his constitution were yielding. He had become pale and œdematous, with habitually oppressed breathing, which in a great degree incapacitated him for all active

duties, and rendered him subject to frequent attacks that immediately threatened his life. Being a medical practitioner of the metropolis, he of course had the advice of many, and those the most skilful, and was regarded by all as labouring under confirmed organic disease of the heart ; so that no attempt was made but with a view to present relief, and he had not for many years left his house without his name and address in his hat, fearing that he might not return alive. I was led from many circumstances, notwithstanding the severity and long continuance of the symptoms, to regard the affection of the heart as chiefly sympathetic. The function of the liver was always more or less, and occasionally much disordered ; and several of the symptoms led me to believe that if organic disease of the heart did exist, it was not in sufficient extent to cause the effects I witnessed.

For many months he steadily pursued the plan of treatment which I have laid before the reader, taking half a grain of blue pill three times a-day, combined with such other means as tended to restore the digestive organs, and relieve the occasional more severe attacks. This plan had not been continued for many weeks before symptoms of amendment appeared, and in the course of a twelvemonth I had the satisfaction to see him relieved from every symptom of diseased heart. His colour became healthy ; the dropsical swellings left him, and he was restored both to the appearance and functions of health. He was so impressed with the plan of treatment which had been pursued, that he published the account of his case, to which I have just referred, and which, as he was in every respect so well

qualified to give it will make a stronger impression on the reader than any account I could give.

I could mention several similar cases, though of less continuance ; in one of which the symptoms of organic disease of the heart were quite as strongly marked, and which, after a continuance of many years, yielded as perfectly to the same means.

ENOUGH has now been said to illustrate the two objects I had in view in the present Treatise :—the extensive influence of sympathy in the phenomena, and consequently the necessity of never losing sight of it in the treatment of diseases ; and the power of mercury in influencing their progress, arising from its influence on the extreme parts of the sanguiferous and nervous systems, on which all the vital functions, with the exception of the circulation, immediately depend, and its controlling the affections of the organ whose vital sympathies are at once the most extensive and the most powerful.

No practitioner can avoid observing, under certain circumstances, the beneficial effects of this medicine, employed either as an active and present, or as an eventual and more slowly-operating means of cure. These are often apparent to the least observant ; but to distinguish all the cases adapted to its employment, and to regulate it in the most beneficial manner, require a more extensive knowledge of the nature of disease, and the effects of the medicine, than at first view appears. No one can be more sensible than myself how much remains to be done in these subjects. All I have attempted is to give the result of my own experience relating to them, and point out what appears to me to

be the proper mode of investigating them; and particularly to press on the reader that while our attention is confined to the more prominent symptoms of disease, and the more immediate effects of the medicine, we may do much harm by so active a means, and we shall certainly lose much of the advantages it is capable of bestowing.

THE END.

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